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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

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VOLUME LIV
Number 1.

Huson's Wire-Rope Tramway for Mines.

The system of transporting ore, etc., over rough surfaces and up and down steep mountains by means of a wire-rope tramway, has proven itself reliable and convenient. In the Huson system, which we illustrate in this number of the PRESS, the principle of construction may be briefly described as consisting of an endless wire rope, traveling over grooved wheels or sheaves secured to the cross-arms of elevated supports placed from 100 to 300 feet apart; the rope, carrying suspended buckets, so fixed as to clear the sheaves, passes around large horizontal or inclined wheels provided with devices for gripping the rope, which prevents the same from slipping and enables its speed to be regulated. It will be seen that when the rope is set in motion, either by gravitation or by motive power, it will carry with it the buckets at such a rate of speed as may be determined to be most suitable for the amount of material to be moved, and where the grade is not less than 15 feet in 100 feet it will transport freight without the aid of power—the loaded line down being sufficient to overcome all friction and carry the empty buckets up the grade. The use of the foregoing system is now quite extensive and is especially adapted to the transportation of ores from mine to mill or point of shipment. It may be run at all times, equally as well through night and storm as mid-day of the finest weather. It is never subject to snow blockade, and requires no grading.

In this system there are grip-wheels at the ends with adjustable grips that can be set or adjusted to any sized rope—ropes are continually wearing and shrinking in diameter—and the adjustable grip is necessary to hold the rope while being run by gravity or power. There are metalline-bushed sheaves on all the derricks or stations which require no oil or other lubricant. The vertical clip enables the rope to run in an open-grooved sheave of any depth. The peculiar construction of the clip, in connection with the sheave and skip outside, admits of curves being made with safety, and strong winds cannot blow the rope off. Another peculiarity of this device is that it has "angle-wheels," which enables a right-angle turn to be made.

In addition to the automatic loader and dumper at the end of the line, there is one which may be placed along the line anywhere, connecting as many mines as may be desired, and so arranged as to load alternate buckets and deposit the ore by dumping into separate bins with precision and regularity.

A general view of the Pay-rock tramway at Silver Plume, Colorado, built on this system, is given on this page. This tramway is at an angle of 21°, and coal is frequently carried to the mine by loading every third ascending bucket, which does not materially diminish speed of buckets.

Fig. 2, on page 5, represents the upper terminal of the Huson system and the manner of loading the buckets. As the bucket approaches, the bail of the bucket intersects with and is held by the sprocket or rag-wheel; the pendant of the bucket coming in contact with a stop projecting outward from the loading car, prevents the bucket from passing around the

way is never stopped for loading. One man is necessary to charge this hopper or car where only 50 tons are moved in 10 hours. Where larger quantities are moved it will require more help. This upper end is provided with a brake, which requires one man to regulate the running and is always under his control.

Fig. 3, page 5, represents the lower end, showing the mode of dumping of the bucket. This lower terminal is pitched or inclined to conform with the mountain, and by means of the side car or cage the pendant is changed from a hanging or vertical position to that of right angles with the rope. When the pendant comes in contact with the cage, the lower end

have a sliding movement, to tighten the cable without cutting and splicing the rope.

A number of these Huson patent tramways are in use in various mining districts, for transporting ore, supplies, timber, coal, etc. They are arranged to convey passengers also, some of them carrying the men to and from the mine or mill. In mountainous districts they are invaluable, and more especially where heavy snows are common. The agents in this city are Parke & Lacy, No. 21 Fremont street.

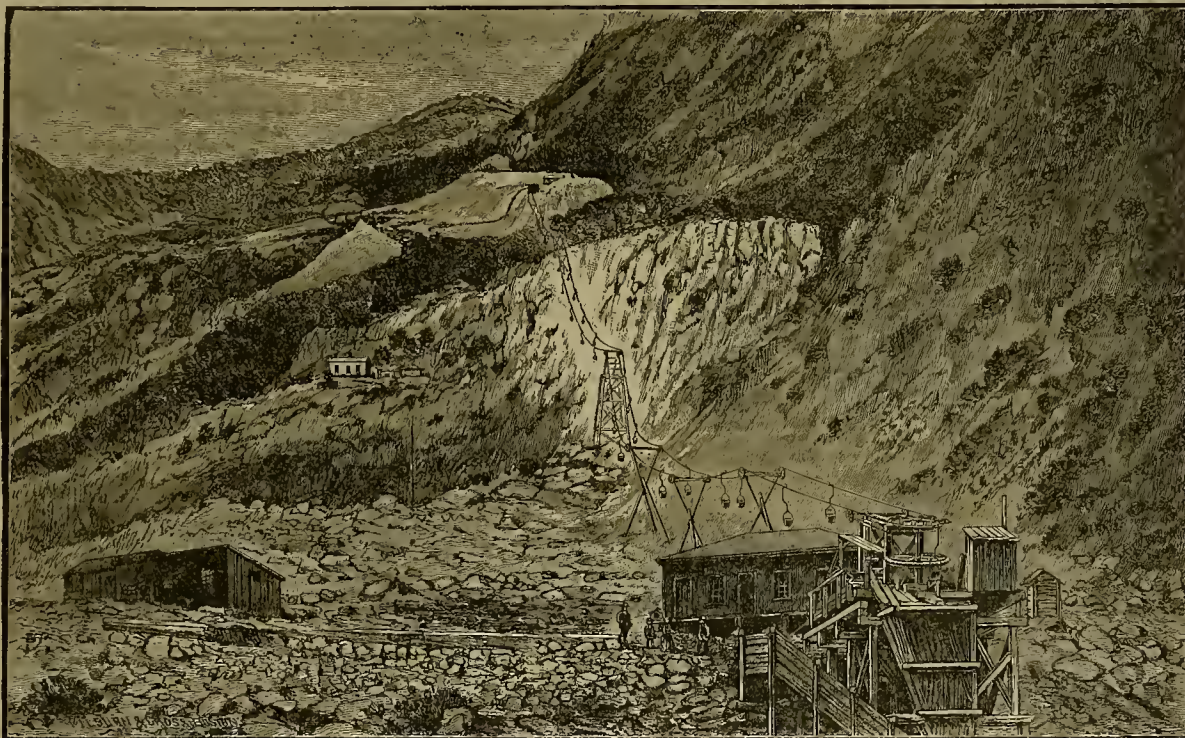
"Fine" vs. "Find"?

In reply to the note of "Prospector," published in a late issue of the PRESS, we admit that the passage in the Bible cited by us was misquoted, as we knew at the time. It occurs in Job 8-1, and reads as follows: "Surely there is a vein for the silver and a place for the gold, where they *fine* it," not *find*, as we had it. But for all that, we believe, with some biblical commentators, that our rendering of the text is the correct one. The sacred writer is here describing where and under what conditions the precious metals occur; silver in veins and gold, as "Prospector" himself remarks, in placers, or in such places as you may happen to *find* it. What sense would there be in saying silver occurs in veins, but gold in refineries, mints, banks, treasures, etc.? Evidently the Bible version of this passage is

to be classed among the many typographical errors with which that book is said to abound.

"Prospector" appears to have great confidence in the biblical lore of our local clergy, forgetting that only last year one of these divines, conspicuous for his learning, declared from his pulpit that nowhere does the Scripture say that Jonah was swallowed by a *whale*, but by a *great fish*; whereas, the New Testament tells us that as Jonah was three days and three nights in the *whale's* belly, so was the Son of Man three days and three nights in the sepulcher! Between the mistakes of the translators and printers, and an occasional blunder on the part of the preachers, there is reason to fear that much of error has crept into the text as well as into the interpretations of Holy Writ, all which we feel called upon to correct, more especially in that department of theology that relates to mining.

THE World has organized a snowshoe expedition, under the leadership of Lieutenant Frederick Schwatka, of arctic fame, for the mid-winter exploration of that wonderland of this hemisphere, the Yellowstone National Park.



HUSON TRAMWAY AT PAY-ROCK MINE, SILVER PLUME, COLORADO.

end, without moving the loading car with it, and as the loading car moves upon a circular track, the cam at the top raises the gate of the loading car by means of a grooved roller connected to the gate, and allows the load to drop directly into the bucket. It will be seen that the loading car cannot be moved except with the pendant, and the bucket, therefore, must be directly under the loading car before the car is moved. This car runs upon a circular track, and travels one-half of the circumference of the wheel, which is eight feet in diameter. And when the car gets nearly to its destination the track diverges from the center, which causes the car to loosen itself from the pendant, and is returned by means of a weight attached to it with rope running over sheave wheels. This loading car, with its triangular hopper or body, runs under the platform upon which the ore is dumped. This platform having a hole or a chute in it, directly over the loading car, the ore is put in by shoving it from this platform down through this hole or chute, and when sufficiently filled the bucket comes along and takes the car with it, thereby taking on its load. This operation is repeated, and the tram-

is held back by a projection on a tripping bar connected to or with said car, until the clip at upper end of pendant, which is fast to the rope, strikes or comes against a similar stop at the upper end of the tripping bar, then the cage is moved downward with the clip upon the rope until the bail of the bucket is fairly into the sprocket-wheel; then the tripping bar and stops are released and the cage is returned with a weight ready for the next bucket. The cam or bar of iron which tips the bucket can be bent and arranged so as to turn the bucket directly upside down and hold in that position until it passes away from the wheel opposite to where it enters. This cam can be placed upon the side of the terminal, and, in connection with the cage or car, will dump the bucket at the side; and, by extending the track upon which the cage or car runs, a series of cams will dump the ore into several bins, and if more than one mine is upon the tramway, the pins at the bottom of the bucket can be made of different lengths, with the came of different heights, and the ores will be dumped into their respective bins automatically with precision. This lower terminal is built usually so as to

Oregon Mines.

Quartz and Placers of Josephine County.

From an extended article in the *Oregonian* we condense the following:

Rugged mountains alternating with steep canyons and narrow valleys make up the northern portion of Josephine county, a region that is good for little besides mining. The rocks contain auriferous quartz veins, and placers are found upon nearly all the streams. The water-courses connect with Rogue river, the streams flowing a westerly course. Toward the north is Wolf creek, upon which there are some eight or ten gravel miners employed. On Coyote creek is the noted Ruble claim, which gives employment to a dozen men in the season when water is plenty, and has enough good pay dirt to last for 20 years. By some this claim is held to be the most valuable in Southern Oregon. Its yearly output is not known, but there is no doubt that it is being worked with judgment and energy. On Tom East creek, Joe Dicer took out \$1000 in the middle of last season before it was time to clean up. Again, no figure of production can be given, but it is probably fair to credit these creeks and their tributaries of Northern Josephine with an average annual yield of \$20,000. The placers, particularly the deep ones, are not by any means exhausted, and experienced miners tell of many locations where pay dirt exists in great quantities and only requires the introduction of water in order to produce a great deal of gold. But, unfortunately, the construction of a ditch would prove very expensive, as only the Rogue river itself is thought to be capable of supplying the required amount of fluid, and, in case its supplies were drawn upon, a ditch fully 50 miles long would be required. Should it be built, it will render productive some hundreds or perhaps thousands of acres of auriferous gravel lying upon Evans', Sardine, Grave, Wolf, Coyote, Jump-off-Joe and Whiskey creeks, and will transform the lonely region, where now a few dozen miners eke out an uncertain existence, into an active mining region. Within the domain of hydraulic mining there is hardly a more promising enterprise. The total number of placer miners in this part is about 80, half of whom are working on Grave creek.

As for quartz mines, this portion of Josephine possesses few of value. Only two, the Lucky Queen and the Esther, have ever been worked to any extent, while the latter only has ever paid expenses for even the shortest length of time.

The most noted placer mining localities in Josephine are in the southern part, lying upon those streams which flow into the Illinois river, being Althouse and Sucker creeks. Galice creek, likewise a most important district, is near the western edge of the county, the creek flowing into Rogue river 10 or 12 miles below the mouth of Jump-off-Joe creek.

The quartz mines of Galice creek embrace the Green and the Yank ledges, which are parallel, but totally dissimilar lodes.

The Green Mine.

Called also the Sugar Pine, was discovered 20 years ago, and has been worked more extensively, perhaps, than any other claim in Southern Oregon. The vein is in slate, extends nearly vertical, with a strike nearly north and south, and oblique through the country rock. The thickness of the vein varies from nothing to three feet, averaging perhaps seven inches. The vein matter is white, splintery quartz, accompanied by much talc, with occasional deposits of calc spar. The metallic constituents are chiefly iron pyrites, copper pyrites, and a very little galena, which last is regarded at the mine as an infallible indication of "pay rock." The sulphurets of copper and iron occasionally occur in large masses, forming a considerable part of the vein at the point, and these massive pyrites carry a very high percentage of gold, the assays of solid specimens of copper pyrites reaching \$2000 per ton. Part of the quartz assays from \$30 to \$30 per ton, a portion falling below \$20, and another portion, containing too little gold to pay for extracting, is waste rock. The workings include four tunnels, the longest 550 feet in length, and four aggregating over 1200 feet; a shaft 60 feet deep, a winze 65, and many yards of stopes. The amount of pay rock extracted has not much exceeded 1000 tons, whose yield probably averaged \$25 per ton, as worked in an arastra, with a loss of nearly all the rich sulphurets, of which but a small part was saved.

The Yank Ledge.

No greater quartz vein has ever been discovered than the Yank ledge which crosses the Rogue river, three miles below Galice creek. It is 250 feet thick, and has been traced for 20 or more miles, north and south. It is a contact vein, with a slate hanging wall, and hypopyenite on the foot. The vein matter is mainly a bluish quartz, colored by copper, which is plentiful, existing as copper pyrites, and near the surface there are oxidized compounds, such as chrysocolla, azurite, etc. The soluble salts of copper have coated the interior of lately constructed tunnels with a deposit over a quarter of an inch thick. Numerous wide crevices occur in the quartz which are mainly filled with a soft material containing much oxide of iron and resembling the "gouge" of ordinary veins. Assays of the quartz show from \$2 to \$36 per ton in gold and silver, with a small per cent of copper. A part of the vein is occupied by a shoot of heavy spar some 20 or more feet wide, which forms an important part

of the vein matter. This is not thought to carry valuable minerals.

Such is the magnitude of the vein that an immense sum of money must necessarily be expended in order to prospect it, and no one possessed of the requisite capital has as yet shown a sufficient interest in the matter to invest therein. It is quite within the domain of the possibilities that the great Yank ledge may be found to contain immensely valuable ores, and certainly the worth of the claims would be very great if only low grade rock existed. It will probably be many years before its value is demonstrated. Not far away—in fact within a league's distance—lies the Mammoth, another incredibly thick vein, which is exactly parallel with the Yank. Of it, less even is known than of its neighbor.

Southern Josephine.

The mines of Southern Josephine form the chief resources of the people of that isolated but pleasant locality. In former times much placer work was done, which has left its traces in earthen hillsides, and creek and river beds turned topey-turvy. Some work of the sort is still done, and the average yearly product of the region may be reckoned at \$70,000 more or less. The best resource is the huge and endless gravel beds like those near Waldo, which are every year attracting more and more attention and will ultimately be worked on a scale befitting their importance and extent.

There is no means of knowing just how much auriferous gravel still remains to be washed, but it seems that if anything, the annual product from deep mines is increasing slightly, with a tolerable chance of a more rapid increase for the immediate future. There is opportunity for large hydraulic operations similar to those of California, with the unquestionable advantage of having ample ground on which debris may be dumped without injuring anybody. No debris law will ever afflict the mines of this State. We will advert to the topic of the extent of placer deposits in another connection.

Quartz mining has been even less a permanent interest than in the northern part of the country. A few mines have been opened, one only with encouraging results. Thus, the Enterprise mine, east of Waldo, has an 18-inch vein in quartzite, the quartz yielding \$26 per ton in the arastra.

MINING IS LEGITIMATE.—Mining for any of the metals is just as legitimate as any other occupation pursued by man. Mining after any method is legitimate. There is no law in the civilized world and there is no decree of any court among civilized people which declares mining by any method to be illegitimate. Any occupation followed by man is legitimate as long as such occupation is not forbidden by authority of the law. Mining needs no law to establish its legitimacy; no more than farming does, no more than shoemaking or tailoring does. And no decision of any court has declared hydraulic mining to be illegitimate. But the courts do say that hydraulic mining has injured lands and farms, and that the injury must stop. The Temple decision does not say that the mining must stop, but that the mining can be legitimately carried on when it is done without injury. The Sawyer decision says the same thing, only that Sawyer, the man, goes to the extent of saying that hydraulic mining cannot be done without doing great injury to private owners below the mining and to the streams and water-courses that are of use to the public. It is the injury that is decided against by both Temple and Sawyer, and not against the mining itself. Hydraulic mining is not, according to the courts, bad in itself, but results in badness, which is to be prohibited. That mining is not *malum in se* but is *malum prohibitum*, as the Latin of the lawyers would have it. Our contention is that quartz mining does not do as much harm, in making debris deposit, as farming. It is not an evil to be prohibited and the courts cannot and will not try to stop quartz mining.—*Foothill Tidings*.

THE MINES OF THE MOTHER LODE.—Considerable activity is being shown among the quartz mines running along the mother lode in the vicinity of Rawhide and Jamestown, Trolnolme county. It is reported that capitalists have taken hold of what is known as Rawhide No. 2, and will push the work of development at once. The next claim on the lode south is the Alabama. A few days ago a fine body of ore was found in this mine on the western slope. A vein four feet in width was developed, which shows a good quality of free gold and promises to yield a handsome profit. Next south is the Crystalline claim, which is being steadily worked. Then comes the Gem. A large amount of ore is already on the dump that has been piled up recently for the want of water. This mine has paid a large sum to its owner, and the ore now ready to be worked will add materially to the aggregate. There are several other claims along this great mother lode in which, sooner or later, will be found untold wealth. There is a large field in this section for enterprise. The time will come when proper development will open up the various veins and leaders that form a network until at a depth will be found rich and lasting mines. The work thus far has not gone beyond what is termed as surface work. Now that attention of leading mining men is being attracted to California, since the breaking down of mines in other States and Territories, they certainly should give the mother lode, with its many branches, a proper consideration. Its possibilities are great.—*Union-Democrat*.

Old Mexican Mines.

Not so Rich as Reported.

Many of the mining papers, says the *Denver Tribune-Republican*, are quoting a remark attributed to Sir Charles Lyell, the eminent geologist, which is that "the interior of Mexico is the richest known argentiferous section in the whole world." Something very similar to this is also said to have been stated by Humboldt. Romancers, of high and low degree, have played upon the same string until the whole world has come to believe that Sir Charles Lyell's remark is true. Even among financiers the possible wealth of Mexico in silver is said to be feared as a thing which may demoralize all calculations regarding silver supplies and silver coinage. The very truthful statement is made that the Spaniards worked out only the surface of the veins, ceasing operations when water was reached; that with crude methods of mining and smelting they produced two or three billion ounces of silver in 200 years, and from these facts they argue that with modern methods and modern machinery the same veins at greater depth can be made to yield more abundantly than ever, and to flood the world with the white metal.

The argument looks plausible, but it is based upon false premises. Not infrequently one finds the old gray-headed and erroneous statement that as mines increase in richness with depth, the abandoned Mexican mines will yield more largely below the water level than they yielded above. The fact is, the Spanish adventurers who visited Mexico with a cross in one hand and a sword in the other to gather silver for Christ's sake, got the cream, as those who get the ore near the surface generally do. Their crude methods of mining and ore treatment were the best possible methods under the circumstances. They mined exclusively with slave labor, the slaves raising the corn and vegetables upon which they subsisted. As the conquered natives furnished the slaves, the cost of mining was merely nominal, and whatever was produced was very near all profit. It is quite apparent that these are advantages which enabled them to work remarkably low-grade ore, advantages that cannot be obtained at this day.

As for the smelting processes, an examination of many of their slags showed that they understood their business and did work of which a modern metallurgist would not be ashamed.

Years ago the writer read those stories which fire the imagination, and as a result sought for that wondrous wealth along the Cordillera of Anahuac through the interior of Mexico, as well as where the golden-roofed palm looks out on the blue waters of the Caribbean sea, and the rustling cocoanuts grow on the shore of the Pacific, and he found no evidence of wondrous silver wealth. Many and many an old abandoned Spanish mine was explored as far as practicable, and no rich ore was found. Many a dump pile was carefully searched for a grain, a trace of rich ore, and scarcely any was found which would be called pay ore in Colorado. The conclusion was inevitable that the general run of the ore worked had been low grade.

To-day nearly all the mines worked in Mexico are lodes which were never touched by the Spaniards. The old mines were worked for from 500 to 800 feet in depth, and there are few of them which give any promise of paying well enough to warrant the erection of machinery. To-day a Mexican can build an adobe furnace and smelt ore at from \$5.50 to \$6.50 per ton, and they do good work. By the patio process he can and does work ore at from \$5.75 to \$7 per ton, saving 92 per cent of its value. The old mines, whose standing ores can be mined cheaply, cannot furnish ores which will pay even these prices for working.

There are rich mines in Mexico, no doubt, some of which are undiscovered, but that it is "the richest known argentiferous section in the whole world" is a statement not substantiated by well-known facts. No man must suppose that the Mexicans are a race of people who would allow such riches to lie idle and undeveloped. American miners could learn something from them, and the lessons would often be worth a good deal of money. They could especially learn something about mining laws. There are never any vexatious and costly suits there about apex and side lines, and the great majority of failures are made by those who undertake to use the modern machinery and modern methods of mining and milling.

FASCINATIONS OF MINING.—Wood River Times: Mining is fascinating. Most men have the common trait of thinking their trade or profession the most onerous of all occupations. But who ever saw a miner that did not consider his business the most alluring way of earning a winter grub-stake? One honest miner, who had struck it rich enough to buy into a mercantile house, said that 10 hours were never so short as when delving in the rocky tunnels, expecting each stroke to reveal the shining metal. This maddening scramble for the "almighty dollar" is an all-absorbing passion with us, anyhow.

EXTRACTING ALLUMINIUM.—It is stated that a company has been organized in San Francisco to extract aluminum from the extensive body of clay in the vicinity of Steamboat Springs, Washoe county, Nev. The metal possesses a commercial value of 75 cents per ounce. Its annual production throughout the world does not exceed 3400 ounces.

A Prospecting Tunnel.

The *Foothill Tidings* has already mentioned that Mr. W. H. Weldon, of Oakland, is in this place, and that he has, as is asserted, the title as derived from a United States patent to almost the whole of the ground located and possessed as mining ground by the Maryland Mining Company. In regard to that matter, the patent under which Mr. Weldon's company claims to hold, covers all the Maryland claim, excepting a few feet at the northwest end of the Maryland ground, and on that few feet of ground stands the Maryland Hoisting Works. The patent issued years ago to one Mock, covers four 40-acre lots, and lot 4, and the S. W. $\frac{1}{4}$ of N. E. $\frac{1}{4}$ of section 25, and the south $\frac{1}{4}$ of N. W. $\frac{1}{4}$ of section 25, all in township 16 north, range 8 east. As we understand, Mr. Weldon purchased the ground in question without knowing that the Maryland Company's mining ground was there located. He is disposed to be fair in the matter and has already made a proposition to the Maryland people, which is now under advisement.

And Mr. Weldon and his company have about inaugurated a tunnel scheme which is to be a very extensive enterprise. He has bought the right of way from parties holding titles in the northern portion of the town, for a tunnel. This right of way is for a distance of 3000 feet and runs due east and west. The right of way includes a depth of 300 feet below the surface of the ground and is 150 feet on each side of the median line of the tunnel—or the whole width of right of way is 300 feet.

Mr. Weldon will begin, right away, to sink a shaft on the George Murphy (or Harris) ground, in the northeastern part of town, near the Jewish cemetery. Lumber for the purpose is now on the ground. This shaft will go down 400 feet and from the bottom will run the tunnel in a direction due west. After a few months another shaft on the line of the proposed tunnel will be sunk in Reuben Thomas' ground, in the north part of town (Grass Valley elide), and from the bottom of that shaft work on the tunnel will be prosecuted both toward the east and to the west. The line of the tunnel will be pretty near the north line of the town as incorporated, and the tunnel is to go over into Benjamin Taylor's property to the northwest of the town.

The shaft on the Murphy ground will be sunk by hand power until the water level is reached, and then Mr. Weldon will put on extensive and efficient machinery for all the work to be done. Mr. Weldon has purchased the interest of Mr. George Murphy in the Mascot mine and all the machinery of the Mascot.

The object of running this tunnel is to see what is underground, and to cut quartz ledges and discover beds of gold-bearing gravel. The company has an abundance of money to carry out the enterprise, including payments for right of way and for the purchase of all real estate that may be needed.

Fissure Veins, or Deposits.

The most important mining litigation ever tried in Colorado was concluded in the United States Circuit Court to-day, says a Denver dispatch of Dec. 23d. A million dollars devolved on the result of the trial and a precedent set which involves the title to nearly 500 mining claims in the vicinity of Aspen, Pitkin county, Colorado. The question at issue was whether the Aspen mines contained fissure veins or deposits of ore. If the fissure theory was correct, then the owners of the claims on the apex, or where the outcropping was visible on the surface, had a right under the United States statute to follow the dip of the vein into other claims. But if the deposit theory was maintained, then a vast number of mines on the side of Aspen mountain could be operated by their owners as far as the boundaries of their claims. The present suit was brought by D. M. Hyman, of Cincinnati, against J. B. Wheeler, of New York City, and other capitalists. Hyman owns the Durant mine, an apex claim, and Wheeler and friends own the Emma mine, which lies immediately beneath the Durant, on the side of the Aspen mines. The Durant is the older location, but rich ore was first struck in the Emma; \$1,800,000 worth of ore had been taken out of the Emma when the Durant people brought suit to gain possession of the Emma on the apex theory, and the court enjoined the Emma from further operations. The case has been on trial three weeks, the best known mining experts in the West being about equally divided on each side. To-night the jury brought in a verdict in favor of the Durant mine. The Aspen mine, the richest in camp, lies immediately beneath the Emma, and suit is now pending to obtain possession by the Durant people. Two million dollars have been taken from the Aspen mine and as much more was in sight when work on it was enjoined. Other apex owners have been awaiting the result of this trial, and will now bring suit to recover possession of those mining claims lying on the mountain-side below them. This is the first case involving the apex theory tried in Colorado since the Leadville litigation was begun in the early history of that camp, and which was settled about three months ago in the Supreme Court of the United States against the apex theory. In the Leadville cases the hanging wall was claimed to be porphyry and the footwall limestone. In the Aspen case it is claimed that the hanging wall is of calcite and the footwall limestone.

Iron Ores in America and Europe.

A few years ago the idea that there ever would or could be a dearth of iron ores in the world would have been considered ridiculous. Possibly if we were to confine the remark to iron alone, exclusive of steel, the statement even now might be regarded as utterly improbable. But since steel has so largely usurped the place of iron and become the metal in very large demand, the question has assumed a grave phase, for the reason that ores suitable for the production of steel by the Bessemer process are much more rare than those for the production of iron, and ironmasters, especially in Europe, are already beginning to be seriously alarmed at the prospect of an early dearth in steel-producing ores.

In our last issue brief reference was made to this matter, and the opinion of Mr. J. T. Smith, general manager of the Hematite Iron and Steel Company, of Barrow, England—good authority—was given, wherein he remarked that he "was convinced that there was not a very long future before us (England) when the demand for hematite ore would be beyond the capabilities of this or any other country to produce." Reference was also made to the statement put forth on good authority that the "hematite ores of Spain, the chief source of European supply, and from which mines this country also imports over half a million tons a year, were fast being exhausted, and that the whole world was being ransacked for a possible future supply." No doubt this remark is quite correct, for the only known deposits of Bessemer steel ores from which Europe obtains its supply are those already referred to at Bilbao and localities of lesser note in Spain, which are said to be fast becoming exhausted, and comparatively limited deposits in Algeria and on the island of Elba. It is no wonder, in view of this fact, that much uneasiness exists in regard to the future of steel in Europe and that most anxious search is being made for other deposits.

We have since noticed a statement from Dr. Percy, the veteran English metallurgist, to the effect that within a few years the United States would also, very probably, experience considerable difficulty in meeting their requirements for high-class Bessemer ores." He further remarks that "The known quantity of such ores in the United States is far from abundant, and the same is true of ores, suitable for the basic process." He gives as one reason for his belief that such is the case, the fact that "Bessemer steel-makers in the United States have been compelled to search for foreign supplies of such ores." That "they are now importing large quantities annually from Europe," and that the import in the course of the next two or three years will probably amount to two million tons annually! That would be an increase of about three times our present annual importation, and equal to one-half of our present annual consumption of such ores.

Such a statement, coming from such high authority as Dr. Percy, is indeed somewhat startling, especially in view of the present enormous consumption of steel and iron in this country, and the rapid increase of that consumption. It should be borne in mind by the reader that the United States already consumes one-fourth of all the pig iron, and fully one-third of all the steel produced in the world!

Steel Ore Deposits in this Country.

Our European friends may confidently dismiss their fears in regard to the future of steel, even so far as the world is concerned. Notwithstanding the United States is just now importing large quantities of such ores from Europe, it is not for the reason that they cannot be had in sufficient abundance here, or of the desired quality.

The matter of transportation is just now the chief factor in the way of a full supply of native ores for our furnaces. The sudden and unexpected increase in the demand for steel has made it evident that the geographical distribution of our ores does not properly correspond with the location of our furnaces. It is for this reason that it is found more economical to obtain a large portion of the supply of ores, especially for our Eastern furnaces, from Spain. The large demand on this side of the Atlantic for wheat tonnage, and the small amount of our importations from Europe, make eastward freights very low. In fact, ships are almost willing to bring iron ore to New York as ballast. When our deposits of high-grade ore are more thoroughly opened, and transportation facilities better and more extensively provided for, our Eastern furnaces will have no occasion to look to Europe for their ores. The magnetites of New York and New Jersey, the Cornwall ores of Pennsylvania and the rich and abundant ores of Alabama, Tennessee, and other Southern localities, will soon furnish a full supply for the Eastern furnaces; while the inexhaustible deposits of Missouri and the great Colorado Basin can furnish any output which may be demanded for the central portions of the Union. There is a metalliferous belt east of the Alleghenies and entirely separate from the Pennsylvania deposits on the western slope of these mountains, commencing in Eastern New York and extending thence through New Jersey, Eastern Pennsylvania, North Carolina, and so on to Alabama, which is generally sufficiently free from phosphorus to work well for Bessemer pig iron, and which there is good

reason to suppose will soon be found of suitable quality for making Bessemer steel. It is too early yet to tell definitely what this belt may yet produce. The great deposit at Lehigh, Penn., was never formerly thought to be what it is now known to be. In addition to all these resources, we have the still greater and immeasurable deposits running all along the southern shores of Lake Superior, from Michigan to—nobody knows how far west. The Menominee and Marquette regions; the notable Vermilion mines of Minnesota, and the lately opened Gogebio range within 15 miles of a shipping point on Lake Superior, are capable of supplying the whole world for ages with Bessemer ore. Extensive docks have already been built on Lake Superior to accommodate shipments from the latter locality, and the most active work is going on in railroad construction, to meet at an early day the immense drafts which are expected soon to be made upon these deposits. The present means of transportation, though very great, are far from being able to answer the demand already being made by the furnaces along the lower lake shores. Probably not much short of 3,000,000 tons of Bessemer grade ore may be obtained from this locality during the coming year, and near twice the amount of all grades. So far from being unable to supply ores for our own consumption, there is much reason to believe that the time will soon come when the United States will be called upon to supply Europe, not only with the higher grade qualities of ores, but also with the larger part of the steel which will be required for her railroads and machinery. The wealth of the United States in iron and coal is absolutely inexhaustible, and if need be, will be able to answer the immense calls for those products which must eventually come from the future civilization of Asia and Africa, should those countries, on more thorough exploration, be found deficient in the home supply of those two necessary adjuncts to modern civilization. The needs of our own furnaces are now about 4,000,000 tons annually for Bessemer ore and 6,000,000 to 7,000,000 for pig iron, and this demand is rapidly increasing. It is estimated that within 10 years there will be required upward of 20,000,000 tons of ore of all kinds annually to supply the furnace demand for our own consumption of iron and steel. The amount of money and labor involved in handling, transporting, smelting and manufacturing into merchantable products this prodigious amount of material is almost past comprehension. These ores are now worth at the furnaces where they are required a general average of from \$5 to \$6 a ton.

One of the most rapidly increasing demands for pig iron at this time is for the manufacture of piping for conveying water. The rapidly-growing towns are constantly calling for new water-works or the extension of old. It is said that nothing like the present demand has ever before been known. This, in connection with always improving demand for iron for machinery, is likely to keep up the increasing demand for pig iron. This great demand for both iron and steel has come to stay. It is one of the necessities of the growth of the country and the advance of civilization.

A TUNNEL AND A WELL.—The taking of testimony in the case of Harriet Dower vs. Philip Richards, which had been on trial all the week in the Superior Court, was not concluded till late Saturday afternoon. The argument of counsel lasted but an hour and a quarter, and was confined solely to law points. The case went to the jury and a verdict for defendant was returned. The Dower family were running a tunnel under Mr. Richards' town lot, whereupon he sued in the Superior Court for an injunction, which was refused. By appealing to the Supreme Court he obtained a reversal of this decision. Pending the action of the Supreme Court, the Dowers continued driving the tunnel and drained Richards' well of water. The latter put a bulkhead in the tunnel, and thus again diverted the water to the well. In consequence of so interfering with the tunnel, suit for damages in the sum of \$8015 was brought against him, and this is the case he won Saturday night. Plaintiff claimed that the ledge for the development of which the tunnel was run was known to exist and had been properly located prior to the issuance of the townsite patent by the Government.—*Nevada Transcript*.

CALIFORNIA AND ENGLISH MINE BOYERS.—A correspondent of the *Reno Gazette*, writing from Sierra City, in this State, says: I want to call your attention to a matter that I have pondered a good deal lately: What is the matter with California mining capitalists? It has almost passed into a proverb here that it is no use to try to get an American to look at a mine. The English are the owners now of many of the best mines of this State, and are steadily buying. An English company recently purchased the Alaska mine at Pike City; another company is now laying plans to open the Gibsonville channel, and so it goes. Look at the names of the incorporators of the Phoenix; not a name that is not German. Why is this? With millions of dollars of idle capital, why do the business men of America stand back and allow foreigners to reap the most golden harvest that will be gathered from our mines? I confess I don't understand it. I know of men who have roamed this State all over in search of mines, yet have never made a purchase, but some Englishman comes after and gathers them in. These facts are no credit to our moneyed men.

A Miner's Ideas.

A correspondent of the Prescott (Arizona) *Courier* says: For some time past I have been visiting mining camps in Arizona, and wherever I go I find tons of low-grade ore on the various dumps, the product of labor that is almost entirely lost for the want of a practical, inexpensive way of reducing the same to bullion. I also find in all the principal camps stamp mills and smelters, with roasters, concentrators and all kinds of machinery for working ore, lying idle, not because there is no ore to work, but because the processes are too expensive to work the ore. I also find many mines worked to a certain depth and then patented, because as they go down on the ledges the ore becomes base. The old buildings tell the story of the removal of machinery sold at ruinous figures to be put up in some other place to again come under the auctioneer's hammer. Companies start out with the idea that a mine can stand all kinds of needless expenses and yet pay large dividends, that you can put some dude in as superintendent who doesn't know ore from charcoal, and when ruin stares them in the face, vent their spleen on the mine and the country in general.

The result of all this fool work is that our prospectors are disheartened living on short allowances of bacon and beans, doing just work enough to hold their claims waiting for a boom, and many of them are almost hopelessly in debt, and this works disaster on every other business pursuit. Legitimate business grows and meets and overcomes all obstacles with comparative ease, and there is no business that man can pursue and is without competition that is more honorable and legitimate than mining. The principal business of Arizona must be honest mining and the reduction of the ore into bullion. Upon this all other business must depend. The older States and Territories all have a home market to depend on, and if our mines were to-day worked with vigor, the ore reduced to bullion, we would have a market for all the beef and products of our ranches right here among ourselves, retaining within the Territory the money now paid to railroads for transportation of products to other markets. It is useless for the people of Arizona to wait for some one to come and create a boom, a tidal wave of prosperity that will land us in the lap of luxury and ease. Capitalists are like hogs fishing—if they see one catch a fish all will try to put their hooks in the same place. They who try to paddle their own canoe will get some one to help him sooner than he who waits for some one to paddle it for him. I believe that co-operative effort will place a steel-lined water-jacket smelter, with dust condenser, in each camp, and that by mining the ore produced by the mines within the district all our obstacles will be removed, that each and every miner will work himself out of debt and create a lasting, healthy, prosperous business, and by so doing Arizona will grow into a State and occupy her rightful place in the Republic.

The Mill Creek Purchase.

Relative to the purchase, by a London syndicate, of a group of mines at Mill Creek, Mono county, Cal., about 30 miles south of Bodie, the *Dayton News-Reporter* says: Like all mining camps, Lundy or Mill Creek has had its up and downs, and for the past two years has been practically dead. There is but one mine in the camp upon which any practical work has been done—the May Lundy. That mine has been "expedited" times without number, and there never was anything but a favorable report made upon it. It has, however, been grossly mismanaged, and finally its affairs got into the courts and became so tangled up that it was closed down two years ago. Those who ought to know say that other claims in the district are more promising than ever the May Lundy was. These claims are included in the recent purchase, and as the syndicate purchasing them is very wealthy—its capital stock is \$5,000,000—they will probably be systematically worked.

There are men in Lundy who have been there 20 years, "waiting till the clouds roll by," satisfied that the claims that they have been so long doing assessment work upon would make them wealthy. This reporter is of the opinion that Homer district will prove the richest gold field ever discovered. When once its merits are known that district will have a "boom" unequaled since the "days of '49." If the enterprise of the syndicate that has gone into the camp is equal to its capital, the "boom" is not far distant.

CONCENTRATORS SHUT DOWN.—It is reported in Empire that all the concentrators on the Carson river, except those in use at the Mexican mill, will be closed and a full force of men put to work. The ore will be worked by the old process. Whether the concentrators are a failure or not is not stated. It is more than probable that the richer ore now being extracted cannot be treated profitably by concentrators, owing to the large percentage of chloride it carries. It has never been claimed by the inventor of the concentrators in use on the Carson river that chlorides could be saved by them; hence the suspicion. The treatment of ore under the old regime will give employment to a much larger force of men, and consequently increase the payroll considerably.—*Carson Index*.

No Abandoned Mines at Grass Valley.

There are no abandoned mines in Grass Valley. There are no abandoned claims to quartz ledges, which are not mines but are owned and held for the purpose of making mines upon them. In many instances if claims, or even mines were abandoned, so that relocation could be made, the district would be all the better off and more prosperous. Then men would take hold of the claims, or even mines, who could and would do work. Of course the *Herald* inadvertently used the too-strong word "abandoned" in the above-quoted remarks. Idle claims and idle mines abound. Most of these are held at high figures—too high in most instances. There is the old Allison Ranch, for instance, that is "abandoned" just as the Wyoming mine was. The Allison, in the southern part of the district, stands there idle, with gold by millions in her bowels out of which millions of gold has been taken, and yet it will take more than a 40-foot pole to touch that idle Allison Ranch mine—it will take big money to owners to do away with the present idleness. The St. John (Knights of Malta) is another idle fellow in the northern part of the district, and between Allison Ranch and St. John are many idle, but not abandoned, mines. Water power, however, is going to start up very many, and has started some. The Badger is one of these that has lately felt the stimulating power of water, and the Badger, as our lamented friend, J. W. Gashwiler, used to say of the Idaho mine, "she sits like a duck on the water; she is the genuine 'chawed' rosin." And water is going after old Allison Ranch, they say, and the water will be piped from the North Star to that Ranch, the same water thus being used for power three times: at the Empire, at North Star and at the Allison Ranch. No, in Grass Valley there are no abandoned mines, and in a very short while there will be no idle mines, and before another year rolls by mines will be made down into what are now idle gold-bearing quartz ledges. And all this reminds us that Grass Valley is not a "mining camp," but is a permanent town, and will be here two centuries from now, and then be yielding gold and growing the finest temperate zone fruits that can be raised on top of the earth.—*Grass Valley Tidings*.

ANCIENT DEPOSITS.—In the shaft of the Centennial gravel gold mine, 235 feet below the surface, chips and sticks of wood are found amid a sedimentary formation, showing that an ancient river had passed through there. River sand and smooth washed quartz pebbles were found beneath, and finally the bottom of the shaft, 250 feet from the surface, was in solid lava, some declaring that it was bedrock. With new machinery, work was resumed recently, and the shaft, in sinking deeper, passed through the lava streak into another sedimentary deposit. These deposits are considered to overlie the true gravel channel or river bed. The *Nevada Transcript* says: There were at the Citizens' bank yesterday some petrifications taken out of the Centennial drift mine of Washington Township, at a depth of 300 feet below the surface. They were deposited in the miocene age, and consisted of cycad (now extinct) alder and other leaves, beside several kinds of wood. The imprint of the leaves and wood grains are distinctly shown in the specimens.

BUY UNDEVELOPED PROPERTIES.—Just now while there seems to be a flurry among mine investors we stop in our mad career to remark that the man who wishes to invest in mining should visit the various mining sections and buy undeveloped properties. It is very seldom that high-priced mines bring much profit to the purchaser. Three-fourths of the money made in legitimate mining enterprises is made by those who develop mines. The clear profit arises from increased value, and then there is little risk, as promising prospects can be bought for a song; about all the risk to be taken is the money spent in development, which in no case should exceed one-twentieth the cost of a good mine. If you would make money in mining, buy prospects and develop them, but don't buy them by the acre or square mile, or by the "group;" buy every individual claim on its individual merits. Groups are frauds in nine cases out of ten.—*Elk Mt. Pilot*.

GOLD DIGGINGS.—A hatch of old prospectors paid a visit to defunct claims between the Sutor tunnel and Six-Mile canyon, and fondly imagine they have struck a gravel bed. Some of the stuff was panned out by an old expert and found to be considerably auriferous, and before this issue of the *Tribune* is circulated, the business will be fixed as far as location is concerned. All around Mt. Davidson, gold-bearing gravel is found, and on the west side of Washoe lake a veritable gold lead has been discovered, which will be either ground-sluiced or hydraulicked the coming spring.—*Carson Tribune*.

ORE REDUCTION.—The English mill, near Reno, having been purchased by competent parties, is being put in complete order and condition for the reduction of ores by any required process—smelting, chlorination or leaching. It will probably not be so much of a custom mill as for the reduction of ore in large runs, some one mine, for instance, supplying it for weeks or months at a time.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO:

Saturday Morning, Jan. 1, 1887

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Passing Events.

The PRESS being dated this week January 1, 1887, it is proper for us to wish all of our patrons a Happy New Year, which we do with great good will, and hope to have them with us for many succeeding years.

Light showers have fallen all over the State during the week, but the rainfall is by no means, so far, as much as is wanted.

Trouble with the cable railroad strikes in this city still continues, and some riotous actions have been carried on. There is talk of a general tieup on all the lines, though the men on some of the cable systems are perfectly satisfied with their hours and pay.

It is noticeable that there are at present in California a number of men who are on the lookout to purchase gold properties. It is to be hoped that they will be able to procure what they desire and excessive prices for claims will not prevent their principals from investing here. Every well-equipped mine in a camp is a great assistance to it. Any good company which is operating extensively is a great encouragement for others to commence work. It is therefore well for miners to do what they can to get these investors to purchase and settle in their neighborhood.

The Plymouth Consolidated Mining Company will pay its 44th dividend of 25c per share on the 5th of January. The amount is \$25,000. This is the first dividend announced for the new year.

A COAL MINE has been discovered at Napavine, Washington Territory. The vein is 50 feet in the ground, and is said to be equal to the Pennsylvania product.

Investing in California Gold Mines.

There appears to be just now a good deal of inquiry on behalf of parties abroad for gold mines in California. These inquiries come sometimes through mining experts and agents visiting the State in the interest of foreign capital and sometimes through business and moneyed men coming here for the purpose of looking about and surveying the field for themselves. Of this class of investors or their representatives the number now in California is unusually large, the advent of winter having caused many of them to hasten their departure from the mining regions lying to the north and east of us, where they had before been spending some time with the same end in view. Escaping from the deep snows in the mountains of Colorado and the arctic temperature of Idaho and Montana, they are the better able to appreciate the advantages of our winter climate for mining purposes. The countries they left are deeply buried under the snow even thus early in the winter, the streams being ice-bound and the ground everywhere frozen to a depth of many inches. The wagon roads, the railway over there, are, at all considerable altitudes, blocked with snow, impeding not only ore transportation, but greatly hindering all other branches of business. Owing to these causes the mines and reduction works in the more elevated districts are shut down during this season of the year, the snowslides that occur there always endangering and often destroying the lives of the workmen, rendering this the more necessary. An almost total absence here of these difficulties, dangers and drawbacks is enough to place California a long way ahead of her neighbors, were there nothing else to give her pre-eminence as a mining country. When to this, however, is added her many other advantages, natural or acquired, we feel to congratulate our visitors on having come to a region offering such special inducements for the investment of capital in the business of gold and silver mining.

Being here on such a laudable errand, a few suggestions by us tending to its furtherance will not, we trust, be considered out of place. And first, we remark that while we have here the deposits of the precious metals in countless numbers, of every degree of value and in all stages of development, it will be no easy matter to find a property that, coming fully up to the requirements of those Eastern investors, can be bought for a very small sum. Generally, we observe that the principals in most of these cases want what the English term "a going concern"—that is, a mine opened, equipped with plant, and making a profitable production. We have many mines of that kind in California, and, while they are not exactly on the market, they can almost always be bought at a moderate price. For this there are a variety of reasons. Often the owners of such properties have been long in the mines, and, growing old, would like to get out and enjoy a portion of the residue of life left to them elsewhere. Or these men may be the owners of other undeveloped claims and be anxious to sell an improved mine in order to obtain means for opening up these other claims, some of which, it is believed, can be worked up into properties of large values. Frequently men of ample means will, in like manner, sell "a going concern" at what to the purchaser would be a great bargain, simply for the reason that the owners well know that they can, because of their great experience in the business, and the superior facilities they enjoy for its prosecution, soon work up a virgin claim into a mine quite as valuable as the one they have disposed of, and at a cost vastly less than the price realized for the latter.

But while this is all true, we incline to think that this class of investors would find it expedient to so far relax the above rule as to accept of but partially-developed mines, and even what may be considered good prospects, being such properties as have little or no plant upon them, but which make a fair showing of ore, coupled with other features and indications of value. Of these properties there is no lack in California. They abound in every district, from one end of our gold fields to the other, and as a rule, they can be bought for very little ready cash, ample time being given for their further exploration, where this is required. The reduced price at which these claims can be bought more than offsets the additional risk taken by the purchaser, who, with his larger

means, more skillfully applied, can further exploit the deposit in a more effectual manner and at less expense than could have been done by the original holder.

Under the guidance and advice of a really good expert, the risk incurred in pursuing the course here suggested is very small—not greater than has to be taken in any other, even the safest business we know of. This is certainly the case here in California, where, of course, the hazard attendant on mining ventures has been reduced to a minimum. That the conditions here, everything considered, are more favorable for such an undertaking, will, we think, be conceded by all who have any knowledge and proper appreciation of their character.

What we have here said is merely suggestive. We consider these, our visitors, somewhat in the character of guests. Hence these hints, which we trust will prove timely and helpful.

The Mining Industry.

The annual value of the mineral products of the United States is about \$425,000,000, and some \$800,000,000 are invested in the business. Mining furnishes employment in this country to 500,000 men. In Montana alone, the newest mining country, 50,000 people are dependent on silver and gold mining. Leadville has produced \$114,000,000 and is good for many times that much. The production of California alone in the aggregate runs far beyond a billion of dollars. Nevada has yielded her hundreds of millions, and all the other States and Territories have produced their quota of riches.

Yet this industry is scarcely recognized by the Government. There is no department of mining, and no high officers of the Government to look after the industry. The States themselves do little, if anything, toward the industry. In California, the oldest of all the mining States, we have a State Mineralogist and State Mining Bureau, but the institution is poorly supported and has to fight for existence. It has never had any sufficient appropriation to carry out work that should be done. Even the mining department of the University lacks many necessary things to make it what it should be.

It seems strange that no more attention is paid to this industry by the State and General Governments. One so productive as it is yearly shown to be, employing so much capital and so many men, would seem to demand close attention and careful fostering. Other countries do this on a mining basis much less important than ours. Our Government has a Mint Director, who is supposed to give some attention to precious-metal mines; but the reports are disappointing and of little statistical value, as far as the mines themselves are concerned. The U. S. Geological Survey has a Department of Mineral Statistics which gets up the best reports we have; but even in that the amount set aside is too small to carry on the work as it should be done.

The owners themselves are not men who have much political influence. Whatever grievances they have they say little about, and, as a class, they are not apt to press their claims. Perhaps in course of time the people of this country will begin to realize the value of the mining industry more than they do now, when better measures to foster the industry will be taken.

THE DEATH OF SENATOR JOHN A. LOGAN was sudden and unexpected, and removes another of the distinguished figures of the war. Though Logan had for some time been a conspicuous figure in the local politics of Illinois, he first came to the front as a national character during the Civil War. No one untrained in the military art made a better record. That he had the genius to command is the tribute of Gen. Grant, under whose eye the most of his gallant services were performed. At Champion Hill he covered himself with glory. At the storming of Vicksburg he evinced the most deliberate courage. With a major-general's commission he was appointed by the President to the command of the 15th Army Corps on the death of McPherson.

From the close of the war until 1871 he filled various positions of honor. That year he was elected United States Senator, and was serving his third term at the time of his death. In the last Presidential campaign he was second on the Republican ticket, and many of his friends and admirers predicted he would head the ticket in 1888. At the time of his death he was 61 years of age.

Volume LIV.

A new volume of the MINING AND SCIENTIFIC PRESS commences with this number. The PRESS is favorably known in every mining camp on the coast, and with the increase of the mining field has come an increase of its circulation and influence. During the coming year it is intended to improve the paper as much as possible. We have perfected facilities by which we shall be able to give more original illustrations than heretofore, and intend fully describing all the improved mining and metallurgical appliances as they come out. This feature is a very valuable one to our readers, as it enables them to see all the improvements which are made. Our correspondents who visit the various camps will send us descriptive letters from different regions. Our general weekly mining summary will be as replete with current news as usual. In mechanical, industrial and scientific matters we shall keep careful watch of all that is of interest and present it in condensed form to our readers.

We are always glad to receive from our readers any notes they may choose to send from their mining camps and towns. This information is always appreciated by the editors, and by subscribers. With the beginning of the volume we expect many renewals of subscriptions as usual. We would like our friends also to call the attention of others to the merits of the PRESS, with a view to their becoming constant readers. No one on this coast connected in any way with the business of legitimate mining can afford to be without the MINING AND SCIENTIFIC PRESS, which is devoted to the advancement of this industry. The oldest mining paper on the continent, its experience is valuable to its readers, and they may rest assured they will not find in its columns anything tending to advance questionable schemes of any kind. This has always been its reputation and a well-earned one. Our readers may rely upon it that the interest of the mining community will be looked after with care, and that we shall do all in our power to advance the industry we represent.

A Happy New Year.

The friendly greetings we toss so freely about at the opening of a new year have a beautiful meaning and value. They mean that we have, for once at least, risen so far above the narrow life of self as to wish others well. This is no small thing to do. When one can sincerely wish only good for all others, he has got beyond self and come into the great, warm life of humanity. He has conquered envy, envy and jealousy. This does not mean to overlook the wrongs and vices of others, for that would not be well-wishing. No greater evil can befall many people than to go on happy and content in their present way of life. It means when we can wish all others well, that we desire for them all honorable success and all proper enjoyment. There is a real value in this state of mind. It is a blessing to the one who possesses it as well as to others. It increases the joy of one who lives in that state, and it goes out in fragrant helpfulness and encouragement to all others. And how much we all need encouragement, and what a sweet inspiration there is in the thought that in the hurry of life we are not forgotten. Blessed will be the day when every human soul can say from the heart, "A Happy New Year!"

What a strange glow of enchantment always hangs over the dawn of a new year. We are not invited to move over old ground. The eye opens upon a new landscape and the ear bends to new music. There is no routine in real life. The external outlines may seem the same. We live in the same houses, do business in the same old office, shop, or store, and pass along the streets we have traveled for years; but the heart and mind do not remain the same. If the years are repetitions with any one, it is because the enthusiasm of the heart has been killed. Nature hates a stationary life as she does standing water. It is the activity of the ocean that makes its purity and cures the invalid who breathes its washed and filtered air. Hence the true soul is willing to let the past slip away, for the future is so fresh and new. So let every one make his calls, and pass around gaily his Happy New Year's greeting.

TOMBSTONE anticipates a revival of her mining industries the first of the year.

Liquid Fuel and Boilers.

In the article in the PRESS of last week on the subject of the use of liquid fuel, this fact was briefly mentioned that though it was supposed by some that the oil fuel was destructive to the boilers, this was not really the case. Mr. A. J. Stevens, the general master mechanic of the Southern Pacific Co., gives it as his candid opinion "that a boiler will last three times as long when burning oil as it would burning coal of any kind." He states, also, that "too much cannot be said in that direction." The following letter on this subject will be read with interest:

SOUTHERN PACIFIC CO. (PACIFIC SYSTEM),
SACRAMENTO, NOV. 18, 1886.
Geo. Loomis, Esq., President Pacific Coast Oil Company:

DEAR SIR: In reply to your letter of the 17th inst., we would state that the Southern Pacific Company used petroleum as fuel on the steamer Piedmont from September, 1885, to August, 1886; on the Solano from March, 1885, to August, 1886; and on the Thoroughfare from January, 1885, to August, 1886, and during that time the bills for repairs to boilers were very much less than during any corresponding period when coal was used for fuel. We consider the heat from petroleum fuel as much less destructive to iron, and therefore more desirable than the heat from coal. Yours,

A. J. STEVENS,
General Master Mechanic.
E. FOSTER,
Chief Engineer Solano.

These statements from such authorities as the gentlemen named embody an experience which is valuable. In California the question of the use of liquid fuel is an important one. We have plenty of petroleum, but very little coal. What coal is sold in this State brings a comparatively high price, and the further we get away from San Francisco the greater the cost.

If, therefore, we can utilize our home products to advantage in this connection, it will be a great saving to the community. In Southern California, where the main oil beds exist, more of this liquid fuel is used than here. The impression that its use is destructive to boilers prevails to more or less extent, statements to that effect having gone the rounds of the press. It would seem strange were this so here, since it has not been found to be the case in Russia, where liquid fuel is largely used. In the letter of Mr. Stevens, which was published last week, he says that "during the time the different boats were burning oil, we were not called upon to make repairs to the boilers; while with burning coal there is not a week when more or less repairs are not necessary."

From these remarks it will be seen that it is an erroneous idea to suppose that the liquid fuel is destructive to boilers, and that the contrary is the case. The opinions expressed are the result of experience with both kinds of fuel.

Mining Accidents.

Frank M. Chapman, a miner in the Grand Victory mine, El Dorado county, narrowly escaped being killed last Sunday, in consequence of the premature explosion of a blast. He, in company with other miners, had prepared several blasts in the large cut, and after touching the fuse started to run for the tunnel at one end of the cut. Before young Chapman could fortify himself he was completely showered with rock and dirt, and knocked unconscious at the mouth of the tunnel. His injuries are not of a fatal character. His clothing, it is said, was torn into shreds.

While working at the bottom of the shaft at the Mayflower mine, Placer county, David Samuels met with an accident. A timber about three feet in length fell from the third pumping station and striking the cage, bounded down directly on Mr. Samuels' head, cutting a fearful looking but not dangerous gash.

Last week, Arthur Davis, one of the engineers of the Raymond & Ely mine, Nevada, met with quite a severe accident; the hell-rope lever came down on his hand, crushing a couple of the fingers.

California Copper.

It was at one time thought that the copper interests of California would be very large, as a number of mines have been found at different times. We do not, however, produce over 800 or 1000 tons of copper a year, mainly from Nevada county. This is a very small quantity indeed, as compared with Montana or Arizona,

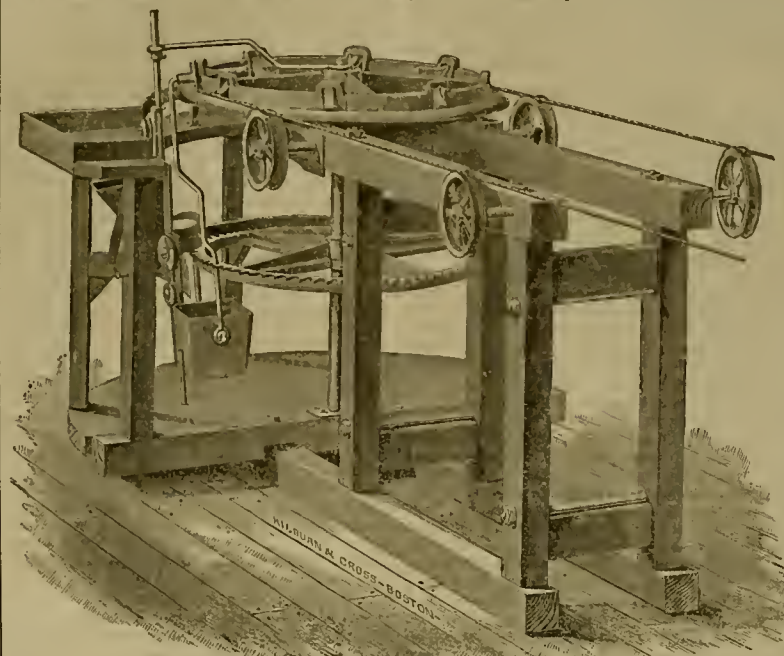


Fig. 2.—UPPER TERMINAL OF HUSON TRAMWAY.

which Territories now eclipse all the Pacific Coast region. The San Francisco Copper Company's mines, Nevada county, make most of the cement made here. More or less ore is, however, exported to England and to Baltimore to be worked.

There are numerous copper deposits in the State, very few of which are worked. Some of the pyrites mines of great magnitude will no doubt be utilized in the future, but at present very little is done.

During the era of high prices and scarcity of

around Copperopolis, and the result is that the company is taking up and buying all the copper mines to be found. The interested parties are now erecting improved works for reducing the ore, and will soon be sending pure copper to the markets of the world. The company claims that a profit can be readily made, with its modern appliances and methods, on ore that yields four or five per cent of metal. The ore

of the above-named mines is of a higher grade than the per cent stated.

Annual Mining Review.

In a few weeks we shall issue our annual mining review, giving a summary of operations of the various mining camps of the coast for the past year. We shall give the full product of the year and all the statistics obtainable. We shall be very glad to receive from any of our readers an account of the pro-

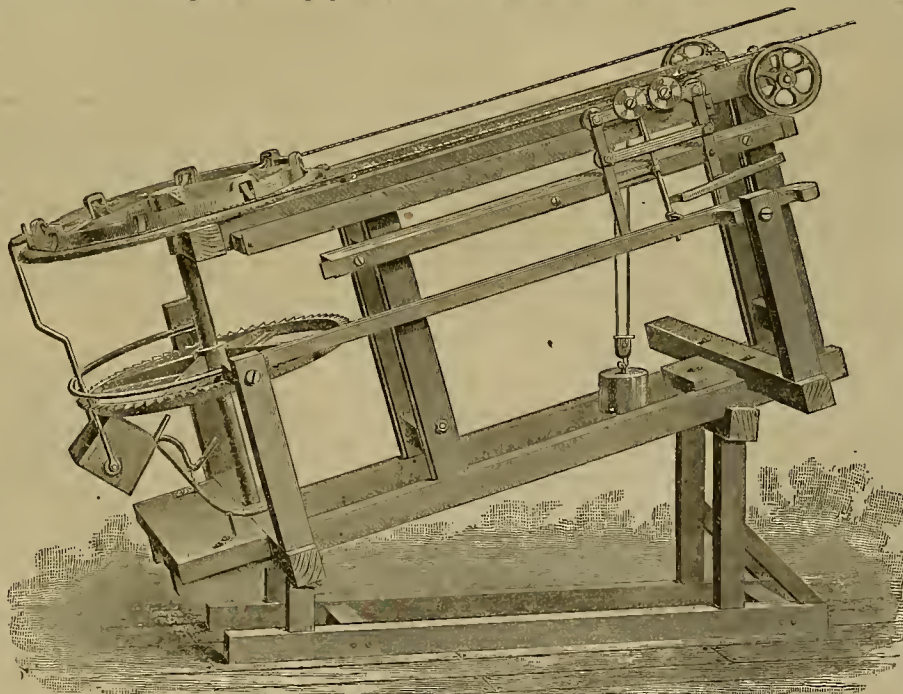


Fig. 3.—LOWER TERMINAL, SHOWING AUTOMATIC DUMPER.

labor in the East work was commenced here on a sort of speculative basis with the Copperopolis mines, Calaveras county, and there were a few years of growing productiveness. There was, however, no local market, and low-grade ore and high freights finally closed those mines down.

At the close of the war, when copper ruled low, the Copperopolis mines were deserted, and have remained so since. We see now, however, by the Stockton Mail, that a short time ago a Nevada company, which has been engaged in copper mining for years past, made an investigation of the Calaveras copper belt

ress of their camps or mines. Many camps have no newspaper to represent them, and the miners should choose some one to "write it up," in order to keep it before the public. We intend printing a large edition of the number of the PRESS which contains the review, which will appear within a few weeks, just as soon as the statistics are available. Send us what notes occur to you and we will put them in a shape for publication.

At Turner's shipyard, Benicia, three coasting schooners are being built, and work will soon be commenced on a brig.

Roasting and Leaching of Silver Ores.

Notes of the Practice at La Yedra, Sinaloa, Mexico.

[Written for the PRESS by CARL A. SCHENK.]

The property of the Anglo-Mexican Mining Company at La Yedra is situated near the northeast boundary line of the State of Sinaloa, in the heart of the Sierra Madre. It takes about five days' ride on horseback to come to the place from Culiacan, the capital of the State. From Mazatlan, the nearest important port on the Pacific, to Culiacan, two routes can be taken, either by stage, which takes about two days' ride, or by coast steamer to Altata, a small port at the mouth of the Culiacan river and by rail from Altata to Culiacan. The traveler saves time and money and has more comfort by taking the coast line route, provided the mail steamer from San Francisco or Panama arrives at Mazatlan in time to connect with the Altata boat.

Altata is the gulf terminus of the Sinaloa-Durango railroad, which is yet in its infancy, only about 40 miles having been finished over a level plain to the city of Culiacan, with no field work being done at present for its extension. Altata is also celebrated for its delicious oysters.

Approaching the camp from the Culiacan side, the sound of the stamps—the first sign again of a vigorous, go-ahead life—is heard long before the mill comes in sight. At last, in doubling a spur, we discover in a large hollow, drained by a narrow ravine and cut out by nature in the side of the mountain, being also leveled off to some extent by the hand of man, a group of large buildings, a monument of modern industrial life in Old Mexico, the reduction works of La Yedra. About half a mile higher up is the mine, of which we can just see the dump.

The Ore Obtained From this Mine

Consists of various minerals; the gangue is more or less crystalline lime-rock, containing also silicic acid; fahlore is the principal silver-bearing mineral, with a small percentage of ruby silver, and associated with these are granular misspickel and crystalline iron pyrites; also zincblende and very little galena. The ore is sorted at the mine, and only first-class, going over 50 ounces per ton in silver, delivered to the reduction works. Enough ore of such richness has been and can be obtained from the mine to keep the 40 stamps going. The ore is crushed dry, as it has to be roasted for the succeeding process of leaching. And even if amalgamation had been resorted to, roasting could not be dispensed with, as the ore is of a very rebellious nature.

The Furnaces.

The Bruckner revolving furnaces which were put up first not proving a success, long reverberatories were built and their number gradually increased to eight. They differ somewhat in construction in the number and position of hearths; in some furnaces all the hearths lie in one plane, no drop or step intervening between two joining ones, and yet each hearth is a separate part of the whole furnace, as appears from the internal construction, each one being moreover provided with its own working door. In others a perpendicular drop separates the planes of two joining hearths; one lies above the other, as step is joining step in a stairway. The number of hearths to a furnace varies from three to six, with one fireplace for the entire number combined in one furnace.

The working doors, one for each hearth, and also the door for the fireplace, are all on one side. Considering the length and breadth of each furnace, and the necessity of providing sufficient means for a good stirring and a rapid as well as clean displacement of the ore from hearth to hearth, the arrangement of working doors on opposite sides, which would not involve an increase in the number of furnaces, would be better. The separate hearths of each furnace are designated by numbers; hearth I is nearest to the fireplace, and in it the ore receives the finishing roast; then follow hearths 2, 3, etc., according to the number of hearths. In the last hearth, for instance, No. 5 of furnace II, which is farthest from the fireplace, the ore is dropped through a circular hole in its arch, which is closed, when not in use, by a cast-iron plate. From a wooden hopper directly above the arch the crushed raw ore drops on the floor of the hearth, forming there a low conical pile, the outlines of which can hardly be made out in the darkness, which at the beginning of the roasting of a new charge is observed in this part of the furnace.

[TO BE CONTINUED.]

Illustrations for 1887.

Having greatly improved our facilities for producing original engravings, the readers of the PRESS may anticipate greatly increased value in our issues for the ensuing year. With the awakening of new interest in many important mining fields, the vigorous pushing of new mining enterprises at home and abroad, and our determination to keep the PRESS in the lead of the mining journals of the world, our subscribers may rest assured that the coming volumes for 1887 will be more than usually valuable and profitable to its numerous and steadily-increasing patrons.

MECHANICAL PROGRESS.

Progress of Mechanical Science.

The following truthful and instructive words are an abstract from an address delivered before the section of Mechanical Science of the American Association for the Advancement of Science, at its late meeting at Buffalo, by O. Channet, of Kansas City: In marked contrast with the past, the present age is one of pronounced material development. Formerly the brightest and most gifted men devoted themselves to religion, philosophy, politics, exploration, art; but for the past hundred years the attention of leading men of the civilized world has been directed to increasing and cheapening those products which minister to the daily life and comfort of man. Farmers, mechanics and laborers live now more comfortably than did the middle classes of feudal times; the duration of human life has been materially lengthened, and all portions of society recognize the importance of further progress, and the advantage of organization and invention in securing it.

[This Era of Material Progress]

May he said to have commenced with the final perfecting of the steam engine, which, together with the various attendant machines, takes the place of hand and animal labor, which has increased and cheapened the production of the necessities and luxuries of life; and it has pushed the inventor and the engineer to the front rank in modern society. It may be useful to point out the absolute necessity of verbal and written intercourse between investigators and inventors, that the speculation and curiosity of the former may ripen into the effective invention of the latter. Nothing is more remarkable than the multitude of minds and facts which are required for the perfecting of even a simple machine, nor how little the least man may need to add to complete the invention. Facts and natural laws, known for years as curiosities, are taken up by some inventor, who fails in the attempt to render them of practical use; then a second genius lays hold, and profiting by the mistakes of the first, produces, at great cost, a working machine. Then comes the successful man, who works out the final practical design, and, whether making or losing a fortune, he yet permanently benefits mankind.

The Faculties of Invention and Discovery are generally separate. One set of men observe facts and deduce laws therefrom; and another set endeavor to turn the results of this observation and deduction to practical account in the production of labor-saving appliances. This section should be the place where these men may meet one another, and profit by the interchange of ideas. Many of the men whom I see before me are devoting their lives to the study of nature, with no desire to make money out of it, but simply to increase human knowledge; and some of their discoveries will eventually be put into practical shapes for the use and convenience of man. History proves, too, that the scientific observers have the safer and happier part. Their success may not be so dazzling as that of some great inventors, but they do not have to bear such bitter trials and disappointments. To deduce natural laws requires mental accuracy in observing and reasoning; to make them useful in doing the world's work requires imagination and ingenuity. Sometimes long years must pass, and generation after generation of inventors wear their lives out, before a needed machine becomes an accomplished success. Evidently, then, the greater the number of minds that can be brought to bear upon a particular problem, the greater is the chance of early success. I believe that it is the particular province of this section of the association to bring these two classes of minds together and to promote their intercourse, that the discoverer may learn in what direction fresh information is needed, and that the inventor may be advised as to what is already known.

The Well-Worn History of the Steam Engine

Gives us an instance of an invention which did not spring full-grown from the brain of the inventor. History informs us that it commenced to exist 200 years ago, in the eolipile of Hero of Alexandria. His treatise remained hidden until translated and printed in 1547; and then Branca, the Italian architect, constructed one for pounding drugs. Hero's hook ran through eight editions in different languages, and attracted the attention of a French inventor, who tried vainly to raise water by steam pressure. Then came the Marquis of Worcester, who died a disappointed man, after expending \$250,000. Then de Morland tried using steam in cylinders, instead of in contact with the water; Papin built a steamboat, only to have it seized and destroyed while on its way to England, and he, too, died broken-hearted and poor; Savery went back to using the steam directly in contact with water; and finally Newcomen built an engine that worked; and between 1705 and 1758 quite a number were erected. These engines had a duty of only 5,500,000 foot-pounds per pound of coal, the improvements of James Watt, an instrument maker, increasing the duty to 60,000,000.

My object in giving this sketch is to call your attention, first, to the gradual evolution of an invention by the process of exclusion, by finding out what would not do; and second, the apparent chain of connection, running for over a century, through several generations of invent-

ors, each evidently profiting by the failures of his predecessors, to the extent, at least, of avoiding their repetition. Is it not evident that the earlier inventors would have accomplished greater results had they had a larger range of scientific experiments and advice; and that Watt triumphed because he had the whole faculty of the University of Glasgow at his back, to give him knowledge of natural principles, and information as to what had been done? [So with numerous other inventions named—especially the steamboat, the locomotive, the telegraph, the sewing machine, the reaping machine, etc., each of which was referred to at greater or less length. In continuation, the speaker remarked that—]

Ordinary Technical Societies

Usually discourage speculative papers and discussions, and prefer to hear of accomplished facts; but the busy men who are developing this country need something more—they need to keep up with discovery before it is reduced to practical account, and they need that personal contact and sympathy with men of science which nothing can replace. Engineers, as well as other practical men, owe it to themselves to come to these meetings, bringing accounts of what they have done and hope to do, and especially what they have failed to do, and why; and some speculative papers may well be allowed providing always that they are on a sound basis and stick to facts; for how often is it that the imagined things of to-day become the accomplished results of to-morrow.

DESIGNING MACHINERY WITH REGARD TO REPAIRS.—The designing of machinery is a most important matter and one which should be studied with the utmost care in all its bearings. The matter of repairs is one of the first, if not the very first, which should be considered by the engineer. An engineer may build an engine, or any other piece of machinery, at the very lowest cost of construction, consistent with doing the work required of it, and with power and strength of parts to spare, giving the least possible consumption of coal—if an engine; or requiring the least possible power propulsion, if a machine, and on its being put to work it may very soon be made to appear that he has overlooked the most essential part, viz., facility for being repaired, the cost of which may altogether neutralize all its other excellent qualities. The great need is that every manufacturer of machinery should have a designer and master workman, thoroughly versed in every point. The mere fact of having served their full time in learning their trade or profession, is not always a sufficient qualification. A man must have an aptitude for his business; he must be a person of comprehensive ideas, not confined to mere routine work, if he would succeed as an engineer or a master workman. To become such he must begin with his earliest apprenticeship, and be afraid of neither his hours of work nor amount of pay. His whole mind, whether in or out of the shop, must be absorbed in acquiring the fullest mastery of his trade or profession.

FAILURE OF ENGLISH ENGINES IN RUSSIA.—The St. Petersburg newspaper *Novosti*, which boasts of the largest circulation in Russia, publishes the following statement regarding the alleged failure of the English engines supplied to the new torpedo cruiser *Iliue*: "The failure of the trial of the engines of the *Iliue* should cause our engineer experts to be more careful and cautious in the trials of engines constructed abroad. The cost of the *Iliue*'s engines is £50,000. For this sum the English bound themselves to give a speed of not less than 20 knots an hour, the designs being furnished by themselves. Instead of which, in spite of all the efforts and the presence of English engineers, stokers and artisans on the cruiser, and the use of the very best coal, not a single trial has yet been successful. The best trial has taken place in the presence of the Minister of Marine, Admiral Shestakoff. Another and final trial of the engines was to come off at a later day. If this trial be fully successful and the cruiser really accomplishes 20 knots, still this will not be a guarantee that the engines are in sound condition, and they might after the trial prove to be in an altogether unfit state. From the immense speed injuries might proceed, as was the case when the first torpedo-boats were taken over. For avoiding this contingency the minister has given orders that the engines of the *Iliue* are only to be accepted in the event of there being, after the trial, no repair whatsoever required."

PARAFFINE AS A LUBRICANT.—A correspondent of the *Railroad Gazette* announces that the Erie Railway has reduced its oiling expenses from \$5000 to \$1000 per year by using paraffine on passenger car journals, and has reduced the number of hot journals from 535 to 332. It is now used during the winter months, without the addition of any other oil, but it is found that in summer it becomes so limpid that it is hard to keep it in the axle-boxes. During the summer months it is therefore mixed with some other lubricant to give it more "body."

IMMENSE STEEL CASTINGS.—The Journal of the American Iron and Steel Institute for 1874, Vol. 2, page 439, gives a detailed account of the casting of crucible steel ingots at the Ahoukoffsky works, weighing 40 tons and requiring 1200 crucibles for their production. These are undoubtedly the largest steel ingots ever produced.

SCIENTIFIC PROGRESS.

A DANGEROUS LOCALITY.—According to all accounts there is a strip of country between Charleston, S. C., and Augusta, Georgia, which can hardly be designated as *terra firma*. The inhabitants of that region, the center of the late terrible earthquake disturbance, seem to be slowly working themselves into the belief that they are living upon a very thin shell, and that any moment a vast caving in may take place, completely engulfing the region. This fear is not founded upon a theory developed by inferences. It is the result of empirical science. Facts are being gathered daily showing that an immense cavity exists in the earth in this quarter. A man in Lanrens, S. C., dug a well down to a point where each stroke of the pick produced a hollow sound, and finally the bottom of the well fell out. A line was produced, but after using all the clotheslines of the neighborhood no one could find where the bottom went to, and all hope of recovery has been abandoned. In another town part of the highway disappeared recently into the bottomless pit, and the authorities are afraid to look into it. A local professor has made a careful computation, and says that it will take all the earth in the country to fill the cavity up, and the road commissioners will have to bridge it over or resign. In the town of Ninety-Six, of revolutionary fame, there is a spot where every earthquake rumble in Charleston has been distinctly heard, and it is concluded that the subterranean cave acts as an air-chamber through which the sound is conducted. The *Springfield Republican* says: We should regret very much to lose two or three States from the Union at this time, but if it should come in it would leave an invaluable curiosity. Excursion trains could be run from all directions to the edges of the crust of the earth, affording at once recreation and instruction to thousands of people.

ANTIQUITY OF MAN IN THE UNITED STATES.—Col. Charles Whittlesey has obtained evidence of the existence of two races of man, and possibly of a third intermediate race, as having held possession of the northern portion of the American continent—the more recent of them being the North American Indian or red men; the earlier race he terms the mound-builders. The antiquaries of Europe regard the people who used flint instruments as being prior to those who had implements of stone; and the latter, again, as older than the races using bronze or other metals. In the United States, the race next prior to the white man had very few implements of stone; their knives and arrow heads, their war implements and their agricultural tools, were almost entirely of flint; they had very few and rude instruments of native copper. The mound-builders, on the contrary, who preceded the red men, produced and used tools in the reverse order; their axes, adzes, and mauls were very numerous, and sometimes of stone; their copper tools abundant; but those of flint, very rare. Hence, in this instance, the most ancient people were the most industrious; they cultivated the soil; they possessed more mechanical ingenuity, and left more prominent and permanent monuments. On the Atlantic coast, from Nova Scotia to Florida, are numerous shell heaps, identical with those of Sweden, Norway and Denmark, and known as *kjekkenmæddings*. The examination of several caves gave bones of the wolf, deer, bear, rabbit, etc., mixed with skulls of the red race, and not dating back apparently more than 2000 years. Col. Whittlesey estimates 2000 years as the period also of occupation by the mound-building race, which does not take us back as far as the beginning of the historical period in Asia and Africa.

IMPROVED OBSERVATION INSTRUMENT.—Prof. Corehotani, an Italian inventor, has devised an ingenious kind of instrument for ascertaining the distance of accessible and inaccessible points from the observer and from each other. This apparatus consists mainly of a pair of telescopes mounted on a stand and fixed on a tripod for use; the telescopes being brought to bear on the object, and a reading then taken from a graduated scale on the instrument, which, compared with a set of printed tables, gives the distance. This arrangement obviates the necessity for the base line, which has hitherto had to be laid down in these operations, and all trigonometrical observations are dispensed with. Distance can be measured between the far-off objects, and, by means of a sheet of paper fixed on a drawing board, a rough plan of the country under measurement can be sketched; in the same way, also, the distances of ships at sea, or of moving objects on land, can be determined. The apparatus is claimed to be of special adaptation for land surveying.

INTERESTING CATALOGUE OF METEORS.—Mr. Charles U. Shepard, of New Haven, Conn., says he has accumulated the largest collection of meteoric stones in the United States, if not in the world. The collection embraces more than 500 meteoric stones and meteoric irons. The total weight of the collection is about 1200 pounds. The largest iron, procured from Colorado, weighs 436 pounds, and the smallest, from Otsego county, New York, weighs half an ounce. The largest entire stone, procured from Muskingum county, Ohio, weighs 56 pounds, and the smallest one, from Sweden, weighs less than 50 grains. The specimens have been gathered from all parts of the world. The catalogue

begins with one which fell November 7, 1492, in Alsace, and ends with one which fell February 12, 1875, in Iowa county, Iowa. There are none between 1492 and 1753, but most of the years since the latter date are represented, and some years by several specimens. Nearly every country in the known world is represented in the list. The entire collection is in one of the buildings of Amherst College.

FORCE OF EXPLOSIVES.—Nitro-glycerine and dynamite do not, when exploded, exert such a force as is popularly believed. To speak precisely, the power developed by the explosion of a ton of dynamite is equal to 45,675 foot-tons. One ton of nitro-glycerine similarly exploded will exert a power of 64,452 foot-tons; and one ton of blasting gelatine, similarly exploded, 71,050 foot-tons. These figures, although large, are not enormous, and need not excite terror. Seventy-one thousand tons of ordinary building stone, if arranged in the form of a cube, would measure only 90 feet on the side, and if it were possible to concentrate the whole force of a ton of blasting gelatine at the moment of explosion on such a mass, the only effect would be to lift it to the height of a foot. The foregoing figures are derived from experiments made at Ardeer with an instrument that gives accurate results in measuring the force of explosives.

ELECTRICAL TRANSMISSION OF ENERGY.—Mr. H. Fontaine has been making investigations at the works of the Compagnie Electrique, in Paris, on the electric transmission of energy. The experiments resembled those of M. Marcel Deprez in transmitting power from Creil to Paris, except that M. Fontaine substituted a resistance equal to 100 ohms for the line of 112 kilometers. The result arrived at was that 52 per cent of the power applied to the generating dynamos was transmitted to the brake of the receiving machine. Though this result cannot be considered as altogether satisfactory, yet it is much better than some of those already obtained. If even 50 per cent of the power of our waterfalls could be made available at a distance of from 50 to 75 miles by electrical transmission, the advantage to many industries would be incalculable. And this would be especially true of mining in many districts where fuel is expensive.

DRUIDICAL REMAINS IN PERU.—An article by M. Chalon, on "The Buildings of Ancient Peru," is worthy of notice and of universal interest. To the primitive epoch, succeeding the pre-historic, belong constructions laid with rough blocks, sometimes of very great dimension. It is very remarkable that these monuments offer the greatest resemblance to those which are known in the old world, particularly in France, under the names of raised stones, menhirs, cromlechs, dolmens and the general term druidical. They are very numerous and are spread through all parts of the territory of Peru. According to the author, they appear to have a religious significance and to have served for sepulcher and sacrifice.—*Comptes Rendus*.

A MUSHROOM DEVELOPED IN HUMAN SALIVA.—M. Galippe, having filtered saliva by means of Pasteur's apparatus, the filtered saliva remaining undisturbed, saw appear at the lower end of the filter, not in contact with the saliva, a mushroom made up of tubes of mycelium and of spores. By the advice of Prof. Max Cornu, M. Galippe has cultivated this mushroom in Van Tieghem cells and has been able to prove that it was neither an *aspergillus* nor a *penicillium*. This fungus, which has neither been described nor drawn heretofore, belongs to the monilia family. M. Galippe proposes to give it the name of *Monilia spiculosa*.—*Comptes Rendus*.

ALLOY OF ALUMINIUM AND TIN.—A useful alloy of aluminium and tin has been obtained by M. Bourhouze by melting together 100 parts of the former metal with 10 parts of the latter. This alloy is whiter than aluminium, and has a density of 2.85, a little greater than that of the pure metal, so that it is not too heavy to replace aluminium in instruments requiring great lightness of their parts. It is less affected by reagents, etc., than is aluminium, and also is more easily worked. Another of its merits is, that it can be soldered as easily as brass without any special preparation.

PHOTOGRAPHING CANNON-BALLS.—It is well known that cannon-balls have been most successfully photographed when on their flight from the cannon's mouth, but it seems that quite recently each photograph has been obtained, many of which show, in a remarkable manner, the head of condensed air which precedes the shot. It is this head of condensed air which makes it almost impossible, even for the most skillful rifleman, to hit an egg-shell engulged by a longish thread; and doubtless it is this "head" of condensed air which first wounds when an animal is hit by a rifle shot.

LIFE AND DEATH.—At a late meeting of German naturalists and physicians, Prof. Cohn, of Breslau, read a paper on "Questions of Life" which showed that the great problem is not yet solved, and that in the living organism there are forces which, though they must be mechanical, as they put bodies in motion, yet cannot be split up into components of atomic molecular forces. "The gulf which separates life from death, organic from inorganic bodies, is not closed, and none of our hypotheses will help us to bridge this gulf."

Boiler Treatment and Engine Management.

There being so many engines in use where first-class engineers cannot be employed, it may be of service to such persons to give a few simple rules to be observed in the management of boilers and engines. As new boilers have more or less oil in them, it is best to blow out the first filling at the end of a day's run. This need only be done where there is a tendency to foam. A small amount of oil will prevent incrustation.

The supply of feed-water should be regular. In no case should the feed pump be required to lift water more than five or ten feet, and where the water is fed hot it should come from a tank situated above the pump. If from the high temperature of the water the pump refuses to work, a remedy may be found in allowing a slight leakage around the plunger, thus allowing the accumulation of vapor to escape. A very small air-cock may serve the same purpose.

Never fire when the water is below the lowest gage. The safety valve should receive daily attention, and if not raised by the steam, should be raised by hand. Frequent firing is most economical. Sudden cooling is injurious to a boiler. Portable boilers, in particular, should not be blown off entirely when steam is above ten pounds; the doors should be kept shut while cooling. The efficiency and durability of a boiler are greatly increased by keeping it clean. Where water contains sediment, cleaning should be frequent. New engines that have been exposed in shipping should be thoroughly cleaned before starting, and oil of a good quality freely used during the first few days' run.

A priming tendency will sometimes be obviated by opening the throttle valve slowly. Cylinder cocks should always be open on starting the engine. All leaky joints should be stopped at once, and loose boxes taken up as soon as discovered. The governor belt should be kept tight to insure sensitive action of the governor. To lubricate the cylinder and valve, either cylinder oil or tallow should be used. Lard oil is not good for this. Beside, when new, frequently slip or require to be unusually tight. An application of equal parts of neat's-foot oil and tallow will be found very good on leather belts, and on rubber either linseed or castor oil—the latter preferred—but a small amount at a time will be needed. Animal oil should never be applied to rubber belts.

By observing the above and exercising good judgment but little trouble may be apprehended in the management of an engine.—*American Machinist.*

CUTTING MAHOGANY IN MEXICO.—In Mexico the season for cutting mahogany usually commences about August. Gangs of Indian laborers are employed, consisting of 20 to 50 each, under direction of a captain. Each gang has also a cazador or "hunter," whose duty it is to search the trackless forests for suitable trees to be felled, and to guide the wood-cutters to the places. The felled trees of a single season are scattered over so wide a space that miles of roadway have to be made to reach them, and numerous rude bridges constructed over the rivers that lie in the way. All the larger logs have to be "squared" before they are brought away on rude wheel-trucks along these forest roads. Each truck requires seven pairs of oxen, and the work could be more expeditiously done by our portable engines. The implements used by the Mexicans in this trade are rude and insufficient, large quantities of timber being often spoiled by their insufficiency, combined with the ignorance of the workmen employed.

LOSS OF LIFE IN THE MANUFACTURE OF EXPLOSIVES.—Colonel Majendie, Her Majesty's inspector of explosives, has come to this country, in compliance with instructions from his Government, for the purpose of traveling through the oil regions and studying the laws in different States touching the storage, distribution and regulation of mineral oils and other highly inflammable liquids. He states that heretofore the Explosive act was enacted, 10 years ago, England and Wales had a death-rate of 43 per cent per year in the manufacture of explosives, whereas during the last 8 years of the act, the entire death-rate in the whole of the factories in England, Scotland, Ireland, and Wales included was only 8½ per cent a year. Last year there was a loss of life of only five out of every 7000 employed in these manufactories.

THE SAME OLD STORY.—St. Louis is now priding herself upon having a genuine mining boom. The *Globe-Democrat* of that city gives an account of the greed with which new mining properties are taken up, and cites an instance of a mine on Seaton mountain, capitalized for \$1,500,000, when in reality \$10,000 would be a good price for it. There is no prospect of the mine paying upon such an outrageous price. The same paper reports that an expert will be sent out to examine the property. The final result of this so-called mining boom in St. Louis will be the wholesale robbing of a great many people of their hard-earned savings, and a general curbing of Colorado. We have warned you. Now fire away.—*Idaho Springs News.*

QUADRUPLE-CYLINDER ENGINES.—In view of the high economy of triple expansion, quadruple-cylinder engines are beginning to attract increased attention.

USEFUL INFORMATION.

Rouge for Polishing Metals.

As the rouge found in the market does not meet the requirements of the workman, at least for every metal, we give a very simple method, which allows the workman to prepare for himself just the quality and quantity necessary for his particular work. Heat sulphate of iron, of as pure a quality as can be obtained (also called green vitriol), in an iron vessel over a slow fire, stirring it continually with an iron spatula until it is dry and takes the form of a pale greenish-yellow powder. This powder, after being crushed in a mortar and sifted, is to be calcined in a new crucible and exposed to the fire of a melting stove as long as vapors arise from it. As soon as no more of these can be observed, the contents of the crucible may be left to cool, and when cool will appear like the rouge used for polishing. Its color may vary from pale red to brown-red, or even to blue and violet, but these variations arise only from the different degrees of heat employed, and it may be observed that the higher the temperature has been during the process, the darker the color and the harder the powder—a fact which also explains why the pale red powder is used only for gold and silver, while the violet is used for steel. No matter what the color is, it is very important that the rouge be well bruised and washed in water before it is used. For this purpose three clean glasses are taken and one of them is filled with pure water, in which a part of the rouge is mixed by stirring it for some time with a small piece of wood. After allowing about half a minute for the rouge to settle to the bottom of the glass, the remainder of the red liquid is decanted into the second glass, but every particle of the deposit must be left in the first one. The same process has to be observed also for the second and third glasses, but with this difference: the powder in the second glass is allowed to settle about two minutes, while in the third one it is left for several hours—that is, until the water resumes its natural clearness. The sediment of the first glass is almost valueless, that of the second of medium quality, but that of the third glass is of a very good quality and fit to be used with great advantage after it has been slowly dried. In some cases the rouge thus obtained may be mixed with grease, and generally it will be found of great advantage to moisten it with spirits of wine and burn it in a clean iron vessel.

CURIOUS FACT REGARDING "RICH" MORTAR.

—In conversing recently with one of the oldest and most successful contractors and builders of Chicago, says the *Chicago Journal*, I learned a very curious fact in relation to mortar. He says that mortar in the interior of walls, especially if it be what is called "rich" mortar, is liable never to harden, but to retain its soft consistency even for centuries. This can only happen where the interior of the wall is hermetically sealed against the external air. This both arrests evaporation and shuts off the chemical operation of the atmosphere. My informant said that in England, not long ago, an architect dug in a thick stone wall 300 years old, and took from between the interior stones some mortar as soft as it was the day (the wall was built; and he himself has made some discoveries of the same character. Any one, he says, who doubts the possibility of such a thing can easily satisfy himself of it by putting some rich mortar into a glass bottle and hermetically sealing it. He will find that it will never get any harder than when it was put into it. This curious fact about mortar may be the explanation of some hitherto inexplicable and horrible casualties that have taken place by the sudden collapse of great buildings.

SHOOTING OUT A FIRE.—A chimney leading from the library of George Small, 14 West Monument street, took fire at 11 o'clock yesterday morning and caused an alarm from box 315. There was a slight loss. During the excitement a novel mode of extinguishing the fire was put in use. It has been a practice for years on the part of the police and Fire Department. When the firemen arrived one of the members borrowed the pistol of officer Deaver, of the Central District, and, standing below, fired five shots up the chimney. Instantly the soot and fire dropped down and the fire was extinguished. It was stated that in cases of chimney fires this scheme has worked well. The concussion loosens the accumulated soot, and often much damage has been prevented in this way. The police say it is an old practice with themselves and has never failed.—*Baltimore paper.*

A NEW SYSTEM OF PUDDLING RESERVOIRS, ETC.—It is stated in a Scotch newspaper that Mr. Thomas Fraser, of Aberdeen, has adopted a new method of puddling reservoirs, etc., with clay. Instead of using the clay in the customary wet and plastic state, Mr. Fraser proposes to dry and pulverize it before application; and he claims that by this system greatly improved results can be obtained. Mr. Fraser considers that clay, when wet, has reached its extreme point of "expansion;" and that, accordingly, water will filter through it. Having arrived at this conclusion, Mr. Fraser proceeded to determine whether, if used for puddling in a dry compressed state, clay would not absorb a certain proportion of water, which would expand

it, and render further filtration impossible. He accordingly dried and powdered some clay, and pressed it to a depth of six inches in the bottom of a tube eight feet long, closed at the bottom by a perforated piece of sheet zinc. Mr. Fraser is confident that the system of dry puddling, besides being more efficient, is also likely to be more economical than the ordinary practice of using wet and plastic puddle. As against this, of course, is to be set the well-known fact that the common style of puddling, when carefully done, answers its purpose perfectly, and whether the clay is extremely expanded or not, water does not, in reality, flow through it. Then, as an expense, common puddle is made on the spot, while the drying and pulverizing of the clay for making dry puddle by Mr. Fraser's plan would, in the case of large works, entail a prohibitory amount of fuel and handling. But the fact in regard to the difference in the value of dry and wet clay for puddling purposes is interesting and valuable to know.

PERFUME FROM FADED ROSES.—Instead of throwing away bouquets of faded roses, or other flowers of special perfume, place the faded or dead dry leaves in a convenient dish and sprinkle a little alcohol over them, and the room where they stand will be filled with their odor. In England it is a common practice; very large vases are kept about rooms, into which all the faded rose-leaves are thrown and sprinkled with alcohol, and thus a very pleasant atmosphere is secured about the house. There is no other way of preparing rose perfume, except by the regular process of distilling. Rose flavor can be given to cake, if any one fancies it, by putting the butter to be used in the cake in a saucer or plate, and setting it for some hours inside a vase filled with rose-leaves that are sprinkled with alcohol.

FORCE OF HABIT.—"There is nothing in the world that shows the inborn tendency of mankind to run in a rut more than the architecture of the modern shirt." So said a young man of iconoclastic tendencies. "For years men's vests have been buttoned almost up to the chin, and the little piece of shirt front that would be left exposed has been covered by a necktie. And yet men go on wearing shirts with fronts down to the waist starched and ironed till they are as stiff as a holed plate, and they pay every week for getting two or three of these things carefully polished. A man might as well have the back of his vest laundered every week."

TO CLEANSE GLASS GLOBES.—If the globes on a gas fixture are much stained on the outside by smoke, soak them in tolerably hot water in which a little washing soda has been dissolved. Then put a teaspoonful of powdered ammonia in a pan of lukewarm water, and with a hard brush scrub the globes until the smoke stains disappear. Rinse in clean cold water. They will be as white as if new.

GOOD HEALTH.

Pasteur's Hydrophobia Cure.

M. Pasteur has just made his third report to the Academy of Sciences in regard to his experiments in hydrophobia cases. The report is quite in detail, giving statistics of cures and deaths, together with experiments upon human beings and animals in further perfecting his mode of treatment.

According to this report, up to March 1, 1886, 350 persons bitten by dogs proven to have been mad had been treated. This was in addition to many other cases, the nature of which was more or less uncertain.

Up to October 31, 1866, not less than 2490 persons, all told, had submitted to his treatment. They were from every country in Europe, besides 18 from the United States, 2 from Brazil, and 2 from British India. As might be expected, much the largest number was from France—1726. Confining himself exclusively to his French patients, M. Pasteur says there are 10 for whom the treatment failed to prove effective—six children and four grown people. Two others came to the laboratory too late to hope for success, and both died. There have also been 10 deaths out of the 1726 cases, from other causes than hydrophobia, so far as known to M. Pasteur. Although there might have been quite a number who were not bitten by rabid animals, still the statistics given sufficiently prove the general efficacy of the method.

It may well be supposed that there could not have been any very large number in France over the 1726 who availed themselves of this remedy who were thus bitten; yet M. Pasteur has a record of 17 deaths from those who did not apply to him for relief—a greater number than he lost from all his applicants.

Statistics show that there have been only two deaths from hydrophobia in the Paris hospitals since Nov. 1, 1885, or one year up to date of this report; but previous statistics show that for the previous year the annual average had been 12, and during one year 21 were reported. These statistics are most satisfactory and conclusive as to the efficacy of M. Pasteur's treatment.

In regard to the treatment of the 19 Russians so fearfully bitten some time ago by mad wolves, and about whom much has been said, M. Pasteur asserts that but three of the number have died—one succumbing while still under treatment and the two others only a few

days after it was completed. A telegram from the mayor of the village where these men live, received only the day before this report was issued, reported that the 16 were all well and in good health. It should be here remarked that M. Pasteur's recent experience has enabled him to greatly improve on his first mode of treatment, so that it may now be quite confidently assumed that the world has at last secured an almost perfect immunity from the danger of this hitherto almost always fatal and terrible disease.

The Danger of Kissing.

There is danger in promiscuous kissing, especially in the very common practice of grown people, particularly strangers, in kissing little children. A physician lately said to a friend that he never allowed it in his family. "The danger," he said, "is so complicated and yet so certain that it would take too much time to describe it here. In my case, all kinds of people come to my house and office to consult me, and they often wait hours. If one of my children happens to come in they are almost certain to talk to it, and you know almost the first impulse with people who notice children is to kiss them. Bah! it makes me shudder—tainted and diseased breaths, lips blue with cancer, foul and decayed teeth. You would kill a stranger who would waylay your young lady daughter and kiss her by force, but the helpless, innocent, six-year-old child, susceptible as a flower to every breath that blows, can be saluted by every one who chances to think of it. I tell you it wasn't Judas alone who betrayed by a kiss. Hundreds of lovely blooming children are kissed into their graves every year."

"But, doctor, how can a mother be so ungracious as to refuse to allow people to notice her sweet little children?"

"There need be no ungraciousness, or, if there were, which is the more important, the safety and well-being of the child or the permitting of a habit of ill breeding and doubtful morality at best? Let the mother teach her child that it is not a kitten or a lapdog, to be picked up and fondled by every stranger, and instruct it to resist any attempt to kiss it. Why, there are agents, peddlers of household wares, who make it a custom to catch up a prattling child, kiss and pet it, and so interest the mother that she will buy something she does not want. I tell you there is death in the kiss! The beloved and lamented Princess Alice of Hesse took diphtheria from the kiss of her child and followed it to her grave. Diphtheria, malaria, scarlet fever, blood poison and death lurk in these kisses."

HINTS ON EATING FRUIT.—A correspondent of the *San Diego Union* furnishes the following very useful and suggestive hints on eating fruit, the latter portion of which we would call to the special attention of our city retail fruit dealers:—"The Health Officer some time since called attention to the danger of eating old or partially decayed fruit. This matter cannot be too strongly urged upon the public. There is still another source of alimentary diseases which seem to me equally dangerous, viz.: the eating of raw fruit over which innumerable flies have crawled. How often have we seen boxes of grapes on the sidewalk literally swarming with flies! When we think of the unspeakably filthy quarters from which those flies have gathered and the ease with which disease is thus carried from the sick to the healthy, we may well hesitate to buy and eat grapes thus unprotected. I speak of this fruit especially, because it is nearly always eaten raw, and the ordinary rinse does not at all remove the dangerous specks from its skin. Will not our fruit dealers, especially on warm days, make a more liberal use of netting?"

A NEW DISINFECTANT.—A new disinfecting compound for purifying the atmosphere of the sick-room has recently been presented to the Berlin Medical Society. Oils of rosemary, lavender and thyme, in the proportion of 10, 2½ and 2½ parts respectively, are mixed with nitric acid in the proportion of 30 to 13. The bottle should be shaken before using, and a sponge saturated with the compound and left to diffuse by evaporation. Simple as it is, the vapor of this compound is said to possess extraordinary properties in controlling the odors and effluvia of offensive and infectious disorders.

EARTH INFECTIONS.—A barrel of kerosene oil buried 10 feet under ground will, it is said, contaminate every well within a quarter of a mile, and the oil will be apparent to the taste. The accumulations of privy vaults will extend their pernicious influence even a greater distance, although the water which it affects may not indicate to the taste the presence of any impurity. Whether privy vaults are open or plastered with cement, they cannot keep the poisonous gases and substances from penetrating the surrounding soil.

COFFEE AND EGG FOR SICK PERSONS.—A sick person wanting nourishment and having lost appetite, can often be sustained by the following, when nothing else could be taken: Make a strong cup of coffee, adding boiling milk as usual, only sweetening rather more; take an egg, beat yolk and white together thoroughly; boil the coffee, milk and sugar together, and pour it over the beaten egg in the cup you are going to serve it in. This simple receipt is used frequently in hospital practice.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alameda.

CHROME.—Livermore Herald, Dec. 23: A new cut, to tap the several pockets on a lower level, is being run at the Douglas Mendenhall chrome mine. But little chrome will therefore be taken out during the next month. There is plenty in sight, however, to last for months.

Amador.

PLYMOUTH.—Cor. Amador Sentinel, Dec. 20: Plymouth is a very lively town at present, a good many men being employed at the different mines, the Plymouth Con. and New London. There are several small mines in active operation, and the prospects are that there will be a boom here in the coming spring. Grading for the additional 40 stamps at the Pacific mill is being pushed rapidly. Reeves and others are putting up a small mill for the reduction of ore from the Little Giant. The crusher formerly belonged to Clemens, at Enterprise. Evans & Co.'s mill is running nearly all the time on ore extracted from several mining claims. Ebe has got back from Idaho and says he is going to start up his mill on the Hardscrabble mine this winter.

MCKAY.—Amador Ledger, Dec. 25: The first installment of \$2000 on the purchase price of this property was paid last week. The work of sinking is prosecuted vigorously, and the managers have unbounded confidence that Nature has bountifully stored up her metallic treasure within the confines of their claim.

KENNEDY.—The outlook for the Kennedy continues flattering, although the mill is by no means as substantially constructed as it ought to be, considering the character of the work it has to perform. It was built in a hurry by contract, and now after a couple of months' activity it begins to show its weakness. It is also said that a considerable percentage of gold escapes in the tailings. This is true, more or less, with all quartz mills, but whether the Kennedy exceeds the average of loss we are unable to say. The yield does not come within 75 per cent of the assay value. An expert from San Francisco is now in charge of the mill, and better results are anticipated. Notwithstanding these disadvantages, the prospects of the mine are unquestionably good. In one level a large body of barren rock has been encountered, but in other drifts the ore is reported of excellent quality, reaching as high as \$10 per ton. Reports are current that the company has paid the entire purchase price of the property, two months before the agreement specified. This certainly shows that they have the utmost confidence in it as a gold-producer.

MISCELLANEOUS.—The Zeile mine has just added a circular saw, which will be used in utilizing waste scraps of timber, in converting them into lagging, wedges, etc. At the North California the tunnel has reached a distance of 600 feet. A contract for another 100 feet is about to be let, and it is calculated that this will tap the ledge. There are good reasons for believing that this property will develop into one of the best mines in the Black Hill region between Drytown and Plymouth. Some of the rock from this claim has yielded by actual milling over 77 per ton, which leaves a very handsome profit, as it can be mined at a trifling cost. The Loyal Lead claim is being surveyed in the interest of San Francisco capitalists, who are thinking of purchasing. The mill is idle for want of water.

Butte.

CONCENTRATOR.—Oroville Register, Dec. 23: The concentrator that is being put up at the Mineral Slide mine will be started up early next month. Mr. McCarty on Butte Creek has a good ledge that prospects well, and assays \$54 a ton. The decision on the Pershbaker mine is looked for this month, and the mine will probably be running in a short time. This is one of the richest mines in the State; \$1300 has been taken out at a single load. The Black Channel has been shut down for the present. The Ohio Company at the Forks of Butte have started up for the winter. A large number of men are prospecting on the Magalia ridge for quartz and several good indications have been found.

GOLDEN CHANNEL.—There is a good deal of merit in the Golden Channel mine, on Feather river. The plan of the mine, with map showing bend of the river, length of tunnel to be run, etc., can be obtained from Mr. F. W. Reece. We believe this will prove one of the best mining developments in Butte.

Calaveras.

WEST POINT.—Cor. Calaveras Chronicle, Dec. 25: The announcement in your paper in regard to the promised mining boom in West Point district is about to be a realized fact, that is, if the present developments continue. Our mines have not been idle during the past twelve months. The amount of \$100,000 in gold has been taken out of them and sent below, besides 150 tons of sulphurated quartz rock, valued at \$200 per ton, which has been shipped to Selby & Co.'s smelting works at Vallejo, for reduction. Indications are favorable for double that amount next year. The following mines are in good hands and looking well under the management of their respective superintendents: Keltz Mine, Supt. O. B. Peasley; Lockwood Mine, Supt. G. Brown; Scorpion Mine, Supt. Campbell; Water Lily Mine, Supt. Hicks; North Star Mine, Supt. Captain Mills; Catarrah Mine, Supt. S. Watkins; Bismarck Mine, Supt. O. Mentzel; Specimen Mine, Supt. W. Bastian; Oro Fino Mine, Supt. W. Cook; Valentine Mine, Supt. M. Ayres; Soap Root Mine, Supt. John Henry; Old Henry Mine, Supt. J. Jenkins; Billy Williams Mine, Supt. J. Rowe; Barnes Mine, Supt. J. Jenkins. There are also a few more just started that I expect will fall into line next year.

Fresno.

GOOD FOR THE MOUNTAIN VIEW.—Republican, Dec. 22: Last Sunday Thos. R. Brown came down from the mines in Fine Gold district, bringing with him several hundred pounds of ore from the Mountain View mine. The ore was taken from the bottom of the shaft, 120 feet below the surface, and is a rich mass of sulphurets and decomposed quartz, richly studded with free gold. Experts estimate that the rock will assay \$5000 per ton. The Mountain View is one of the most promising mines now

being developed in this county, and is owned by P. B. and M. J. Donahoe, T. B. Brown and J. N. Albin. They recently purchased it for the sum of \$15,000. They now have about 100 tons of ore in view which it is thought will yield \$1000 per ton.

Inyo.

GOLDEN STAR MINE.—Independent, Dec. 23: At the Golden Star mine, near Independence station, a house has been built and hoisting works erected. Water for steam-power will have to be carried in pipes some distance, and for the present only horse-power is used. Mr. John Patterson, the superintendent, is pushing the work of exploration of the mine vigorously, and has as many men employed as can be worked to advantage.

Mono.

LUNDY.—Bodie Miner, Dec. 22: William Onkst is in from the Tioga and Lundy region on land business. Mr. Onkst now has charge of pretty much all the mines out there. The Miner has time and again asserted the conviction that there is still great mineral wealth in the ground out there which must eventually be gathered. There is a mineral belt of nearly 70 miles in length, extending from Lundy to the southward, that will some day astonish the world by its abundant yield. It is definitely settled that a sale of a group of mines at Lundy, Mono county, has been concluded, and that the purchasers will commence work as soon as climatic conditions will permit. This will be good news to many who have lived in that camp. People have ridiculed Tioga simply because they don't know anything about it.

Nevada.

CHEAP POWER.—Nevada Herald, Dec. 22: The invention of the Pelton wheel and the introduction of water power and its application to mining and milling has done more for the development of Grass Valley and Nevada mining districts than all other improvements taken together. The Idaho mine saves \$30,000 per year, and the Providence, we presume, in the same proportion. An idea of how cheaply prospecting may be done by using water instead of steam may be formed from the following statement, which we know to be correct. The Oro Fino mine is a prospect on Rush creek in which the writer is part owner. The incline is down nearly 200 feet. To hoist the rock and pump all the water that a six-inch Cornish pump can raise requires the use of five inches of water under a pressure of 150 feet. This costs, at 20 cents per inch, \$1 per day. To do the same work by steam power would require expensive machinery and the consumption of at least one cord of wood per day. It is cheaper than prospecting by windlass or horse-power. It is the cheapest and the safest and the best power known. The Pelton wheel and the South Yuba Canal Company's system of ditches running along the ridges lying above the quartz belts, increase the value of the resources of Nevada City and Grass Valley by over 50 per cent.

NEVADA COUNTY MINE.—Transcript, Dec. 21: The ledge in the shaft of the Nevada County mine continues to improve as it is sunk up. It is now from 12 to 14 inches thick, solid, and with every indication of permanency. The ore is dark with sulphurets, and in places free gold is freely plastered over the sulphurets. The stockholders appear to be about to realize the substantial reward that their energy and perseverance entitle them to.

THE IDAHO.—Grass Valley Union, Dec. 23: The annual meeting of the Idaho Min. Co. was held on Tuesday evening, at which the reports of the superintendent and other officers were read and ordered to be filed. These reports are not obtainable for the publication of their details, and it can only be said that the year has been a good one for the company and dividends have been paid each month. It is understood that the workings of the Idaho are getting well up toward the Maryland line, and that the pay chute in its dip to the eastward is going into the Maryland on the east, just as the pay chute dipped eastward from the Eureka into the Idaho. This chute has been of wonderful extent, and although not always rich along its course it has never given out, and has produced in all (to the Eureka and Idaho companies) over \$13,000,000. Whether it is ever going to give out is a question, although the time may come when its gradual dipping into the earth may carry it too far down for profitable working. This has been the greatest chute of free gold ore ever discovered on the Pacific Coast, and serves to show the richness and value of the Grass Valley mining district, which has, it is believed, produced \$100,000,000 since the gold discovery in 1849.

THE NEW MINING VENTURE.—Foothill Tidings, Dec. 27: Mr. W. H. Weldon is at work sinking a shaft on the Murphy ground, in the eastern part of the town and near the Jewish cemetery. The shaft is now down about 10 feet and the size of it is 7 feet by 10. This is to be timbered by 8 by 10-inch timbers. The shaft is to be divided into two compartments. From the bottom of the shaft a tunnel to the west is to be run, and early in the spring another shaft on the line of the tunnel will be sunk on Grass Valley Slide, or in Mr. Reuben Thomas' ground. From this second shaft the tunnel will be run both east and west, and that to the east will meet the tunnel from the Murphy ground shaft. In the early spring, and when timber can be had, hoisting works of a very substantial and efficient kind will be put up at the Murphy shaft. The machinery will be run by water power, with a pressure of 260 feet. The tunnel will probably strike the western extension of the Crown Point ledge. There is plenty of money at the back of this venture, and experienced mining men are conducting the work.

THE NORTH STAR MINE.—Transcript, Dec. 29: It is claimed on excellent authority that the North Star mine at Grass Valley is showing up a magnificent development of high-grade ore, and that the future and permanency of this mine is beyond all dispute and peradventure. The splendid 30-stamp mill of the company which has been in process of erection for several months is partially completed, and will be in active operation in about a month. This mill was erected by the Rison Iron Company, and it is said to be a marvel of automatic appliances and other arrangements connected with the crushing and amalgamation of gold. Mr. Hammond, a brother of the United States Surveyor-General, who has a world-wide reputation, is the general manager of both the Empire and North Star mines.

Placer.

IOWA HILL.—Cor. Placer Republican, Dec. 23: Mr. Mead, who purchased from Wm. Van Vactor

the Canada Hill mine, struck rock last week that will pay \$500 to the ton. Whether it is anything more than a chimney or pocket deponeth sayeth not. At Damascus the Mountain Gate Company is in rich gravel and plenty of it. The channel is running in a southerly direction toward that Dam claim superintended by Andy Watson, who says, notwithstanding the amount of deadwork performed in running the tunnel ahead 900 feet, they have taken out enough to pay expenses. W. Jones, foreman of the Red Point Company, was in town the other day, and says that the tunnel is in over 1000 feet, and they expect to have it into the channel by July next.

Plumas.

QUARTZ.—Plumas National, Dec. 25: J. E. Spencer will start up his quartz mill, on the Miller ledge, situated on the headwaters of French creek, about three miles west of the Buckeye house, the first of the week. From all accounts the quartz prospects very rich.

GRANITE BASIN.—Joseph Peppin was in from Granite Basin last week and reports that he is in 150 feet on the Commercial ledge, and has about 150 tons of good rock on the dump. We are glad to hear that he has "struck it" this time. Christie & Snyder have run a tunnel on the Michigan, tapping the ledge at a depth of 100 feet. The rock is reported very rich, and the ledge is about three feet wide. The outlook for Granite Basin quartz miners is better than for years, and we expect to hear of some large cleanups before long.

NORTH FORK.—The Sunnyside mine is working 16 men, and under the intelligent management of R. Hobart, taking out big pay. Ellis & Bressler, at Big Flat, are working in good gravel, at present. Steven Dean, after running a long bedrock tunnel in his claim, raised up last week and struck a fine body of gravel that promises to yield lots of golden nuggets. Dick White & Co. are running a tunnel from the old works to the new tunnel, where they expect to strike it as rich as ever. Savercool Bros. have leased the Dutch Hill mine and are putting everything in good working condition. There is no doubt this famous old mine will pan out satisfactorily under their able management.

San Bernardino.

ORO GRANDE DISTRICT.—Cor. San Bernardino Index, Dec. 23: The old mining camp of Oro Grande on the Mojave river has been renamed Marble City, from a marble quarry recently discovered in the vicinity; a town site has been surveyed and laid off into streets; the Cal. Southern is putting in a side track, and considerable building is projected. Besides the marble quarry, mines are being opened in the vicinity. The old Oro Grande mine was opened and a mill put up in 1881, but owing to the expense of working and transportation it was abandoned. It has now been reopened. The What Not mine has a tunnel over 300 feet long on the vein, and a shaft is going down at the mouth of the tunnel. The ore improves as the sinking progresses. West of and running parallel with the What Not is the Blind Lead mine, owned by the same parties that are interested in the What Not. A shaft has been sunk on the north end of the vein to a depth of 30 feet and between 30 and 40 tons of \$83 ore extracted. The Flint and Last Chance are new locations on which but little work has been done. There are many other rich mines all over the hills, both on the east and west sides; in fact the whole surrounding country is a mass of mineral and marble. Wood and water are plentiful. The gold is found principally in carbonate of lead and is smelting ore. A smelter is projected.

CALICO.—Print, Dec. 26: Chloriders in the camp are doing well, as a general rule, and every week new leases are taken on the undeveloped mines as well as those that have been thoroughly prospected. Frequently ore is discovered in places where miners have walked over for months and years, and rich strikes made in most unexpected places. There is undoubtedly ten times more ore undiscovered than that obtained from developments in the past, and it is thought by experienced and impartial miners that in ten years from now the output of bullion from the camp will be many times greater than at present. The large profits made by the various companies in the past is beginning to attract attention abroad, and more capital will soon be in extensive operation in this and neighboring districts.

Shasta.

MILL.—Shasta Democrat, Dec. 23: Jack Conant's 10-stamp mill, on Squaw creek, was started up last Friday morning. It works like a top. Jack's monthly cleanup now will be big. A new and rich body of ore was struck in the Balaklala mine a few days ago, at a depth of 60 feet. Good ore in the new tunnel is encountered every day, also. The Tiffin mine, at Lower Springs, improves every day as the tunnel is run. The vein is four feet wide and the ore prospects big in free gold from wall to wall. The Central mine, in Old Diggins, the property of Bell, Hopping & Co., was last week sold conditionally to Edward Riely, representing a New York company. J. H. Vannoy, owner of the Newton, on Squaw creek, adjoining the Uncle Sam mine, last week struck a rich body of ore on his mine. The Calumet Mining Company's mill, situated on the east side of the river two miles above the mouth of Middle creek, will be running by the first of the new year. This is a new mill called the "Rotary Stamp Battery," and miners generally are anxious to see it in operation.

Sierra.

BALD MT. EXTENSION.—Mountain Messenger, Dec. 25: The report that the Bald Mt. Extension mine was about to be closed is purely gratuitous and has no foundation in fact. The return in gold for last week was 160 ounces. Mr. S. Lock has taken hold of the old Plumbago quartz claim, at Minnesota, and is at work getting ready to pump out the old shaft. For this purpose steam will be taken from a boiler about 600 ft. away. The old shaft is only some 25 ft. deep, but there is considerable water to contend with.

NUGGET.—Mr. Staley, a pioneer of Downieville, recently returned to this section after an absence of over 20 years, found a nugget of gold up the North Fork, last week, which weighed eight ounces. He is also getting some fine gold in his claim, which is in the bank near where, in the river, in early days, three men took out 120 lbs of gold in one day. The men were sailors. The new quartz mill of Theodore Smith, of Alleghany, is all ready to run as soon as water comes. The Phenix ditch is about half done.

There is no prospect of getting the mill running before next summer.

Sonoma.

COAL MINE.—Sonoma Democrat, Dec. 23: Ex-Supervisor S. R. Houser is prospecting a coal discovery in the Guallala river about eight miles from the coast. The deposit was first discovered some years ago by Lieut. Jacobsen. Mr. Houser bought the claim several years ago and recently began prospecting it. He has a shaft down about 30 or 40 ft. and it looks very flattering, the indications showing a vein 18 ft. wide and of variable thickness. The quality of the coal has not been ascertained, but experts who have examined specimens say it promises to be excellent. The facilities for shipment are first-class.

Trinity.

BULLYCHOOP DISTRICT.—Trinity Journal, Dec. 25: The Davis Brothers, of this rich and growing quartz-mining district, were in town this week, and from them we obtained the following account of the condition and development of some of the more prominent mines of that section:

MAAMOTH.—The Mammoth mine, of Foster & Hart, well named for its extent, is a 50-ft. ledge on which a shaft has been sunk 25 ft. During the past summer, ore crushed in a Hill rotary mill which got away with 10 to 15 tons per day, averaged from \$12 to \$15 per ton. A tunnel 400 ft. in length is now being run by contract to tap the ledge at a depth of 150 ft., and the company has also let a contract for 300 cords of wood. A new 15-stamp mill is now on the road for the Mammoth and is expected to arrive in a few days.

POUND CAKE.—This mine belongs to Davis Bros. & Co., and is a 6-ft. ledge which is tapped by a tunnel at the depth of 160 feet. The ore is crushed by a 5-stamp mill and goes from \$15 to \$20 per ton. The property is now bonded to an English company, and several other parties are anxious to take it in the event that the bond is forfeited or released.

DOLLY VARDEN.—Just above the Pound Cake, and belonging to the same parties, lies the Dolly Varden mine, with a 3-ft. ledge on which a shaft has been sunk to the depth of 25 feet and is being sunk deeper.

CENTRAL.—Titus & Co. are the owners of this promising mine, which is now being worked by Somers & Scott. The ledge is 8 feet in width and is tapped by a tunnel at the depth of 150 feet. The rock is worked in a Huntington mill and goes from \$8 to \$10 to the ton.

BULLYCHOOP AND OCCIDENTAL.—These two mines, belonging to the Bullychoop & Occidental Co., are at present lying idle and will not be worked during the winter. They have been leased to Cross, Briggs & Franklin, who did some work during the summer and will resume in the spring. The company have a cannon-ball mill, but the last rock crushed was run through the Mammoth mill, on the other side of the hill; a lot of 30 tons averaged \$20 per ton. The Bullychoop ledge is from four to six feet, while the Occidental measures from eight to ten feet. There are shafts down a considerable distance on both ledges. A long tunnel has been run to tap them at great depths, but has not yet reached the ledges. During the past summer there were more than 200 men in the district, about 50 of whom will winter there. All the others will return in the spring with many new workers and prospectors. Bullychoop is not a mushroom district; it has substantial merit and is building lasting prosperity thereon. Its growth has not been rapid, but it is permanent.

STRUCK IT AGAIN.—The untold wealth of Deadwood district is being uncovered and brought to light. A note from Superintendent Henry Martin, of the Brown Bear Company, informs us that they have found the ledge in the Monte Cristo in Tunnel No. 4, and that it shows up good. A sample of the ore sent to John Martin at this place is very rich.

NEVADA.

Washoe District.

CON. CALIFORNIA AND VIRGINIA.—Enterprise, Dec. 25: The output of ore for the past week fell off a little from the previous regular production, owing principally to the temporary trouble from gas, caused by tapping the smoldering fire in the old workings by a drift on the 1600 level. This is effectively subdued and obviated. The assay value of the ore milled during the week is about the same as that milled last week, according to average mill battery samples; the official figures will be given to-day, they not being received in season for publication to-day in this report. 1600 level—The lateral drift north from the north end of the mine was extended 29 feet, making a total of 533 feet. 1500 level—The lateral drift north from the Consolidated Virginia shaft has connected with the upraise from the 1650 level. 1435 level—The winze being sunk below the track floor of the east crosscut is down 67 feet. Material, vein matter and low-grade quartz, 1400 level—The winze being sunk below the track floor of the south drift, 300 feet south of the Consolidated Virginia shaft, has connected with the 1300 level, south drift. 1300 level—The drift started north from the Consolidated Virginia shaft has connected with the upraise above the 1400 level.

SAVAGE.—600 level—Making good progress in the excavation for a large working station on the west side of the old shaft. 800 level—Main south lateral drift extended and timbered 30 feet. Two crosscuts have been started west from this drift. No. 1 is 100 feet south of the north line of the mine, and No. 2 is 55 feet further south. No. 1 is advanced 36 feet in fine-looking quartz, from which some assays are obtained. No. 2 is extended 22 feet, and its face is now entering the quartz body. 1640 level—Drifting north and south is commenced in the fine body of quartz developed at that point, and the rock is being sent out from it through the Sutro tunnel. A new hoisting or gallow frame is being erected over the old main Savage shaft and the works generally are being put in thoroughly practical condition for active service, which will be shortly required.

HALE AND NORCROSS.—1300 level—Main south lateral drift advanced and timbered 45 feet; total, 145 feet from the station. The face of this drift is in a fine character of quartz, carrying some ore. At a point 30 feet from the face of this drift a crosscut, No. 1 has been started west, which is extended and timbered about 20 feet, and shows throughout the same character of quartz and ore as is found in the

main south drift. On this level the north drift has been extended and timbered 40 feet. Second Station level—West drift advanced and timbered 60 feet; total length from the shaft, 190 feet. In the main vertical shaft of the mine a substantial air-pipe, 20 inches in diameter, is being put in, which is to be carried to the 1300 level. In the main incline, or continuation of the main vertical shaft, the car tracks have been repaired and put in complete order to the Suro tunnel connection.

IOWA.—The cleaning out of the Old Iowa tunnel has been done to a distance of over 700 feet from its mouth. The large 40-foot ledge and rich stringers reported cut in this tunnel in 1876 have been found, and good prospects obtained therefrom. Work of development will be commenced immediately in this tunnel. Tunnel B continues cutting stringers of ore dipping flat to the west, and shows indications of near approach to middle lode, from which the bowlders of gold ore found on the surface were shipped. Five tons from these croppings were milled last week for free gold on copper plates and resulted in a little over \$16 gold yield per ton. Tunnel A is a short distance from tunnel B. Work has been resumed driving for the lode.

BALTIMORE.—The laying and introduction of the water pipe, from the Water Co.'s flume to the Baltimore Hoisting Works, a distance of 2800 feet, was completed yesterday. The retimbering and repairing of the shaft is completed from the 225 level up 100 feet, leaving 125 feet yet to be done extending to the surface. A hand windlass has been, and is being, used in this work, and until it is completed to the surface the main hoisting works will not be steamed up, although everything is in most perfect order for immediate work; no better plant of machinery for the purpose ever existed on the Comstock. The first attack for practical ore extraction will be on the 225 and 450 levels.

BEST AND BELCHER.—600 level—East crosscut No. 1 was advanced 10 feet, making a total of 737 feet in length. The west crosscut opposite east crosscut No. 2 is in 60 feet. 800 level—East crosscut No. 2 has been advanced 30 feet, making a total of 177 feet. The material in the drifts mentioned is all vein porphyry, with streaks of clay and quartz.

ALPHA AND EXCHEQUER.—The new gallows frame is up, also the surface buildings, and the upper portion of the Alpha shaft is being retimbered and repaired preparatory to the resumption of work in both mines through this shaft, with a view to the development of extensive bodies of ore found before the flooding of the lower levels of these and all the other Gold Hill mines through the great influx of water tapped on the 2800 level of the Exchequer mine.

CHOLLAR.—350 level—The main south lateral drift, south from the Sharon shaft, progresses well in good and promising vein matter. The upraise being made in the high-grade ore vein developed near the Potosi line is up about 25 feet, continuing in the same quality of ore. The clearing out and retimbering of the old main shaft still actively progresses, and is completed to the depth of over 400 feet.

OPHIR.—1300 level—From the south drift, corresponding with the 1435 level of the Con. California and Virginia mine, east crosscut No. 1, 200 feet north of the Ophir shaft, has been extended 32 feet, making a total of 76 feet. Material, vein porphyry with streaks of quartz.

GOULO AND CURRY.—425 level—The south lateral drift from the main west drift has been cleaned out and retimbered an additional distance of 40 feet, making a total length of 425 feet. Material in face clay, quartz and porphyry.

ALTA.—700 level—Good advancement is being made in the main south lateral drift, skirting along the east side of the Keystone vein. The crosscut west in the Lady Washington ground is in 33 feet, 18 feet of which is in quartz, showing bunches and streaks of good ore—a very encouraging prospect.

QUINN MINE.—Work is going ahead lively in the erection and placing of the new hoisting works preparatory to repairing the old shaft and sinking 100 feet deeper, or to the depth of 300 feet.

SIERRA NEVADA.—520 level—West crosscut No. 5 was advanced 30 feet, total length, 50 feet. North lateral drift No. 3 has been started from this west drift No. 5, and is now 49 feet in length, with its face in vein porphyry and quartz, which gives low assays.

UNION AND MEXICAN.—1300 level—Good progress is being made running the joint north lateral drift; also, in the crosscut east from it, the material in the face of both drifts being very favorable vein formation.

BULLION.—The reopening and repairing of the old Croesus shaft is being energetically prosecuted. The new machinery works smoothly and well, and everything goes ahead effectively.

UTAH.—472 level—Main west drift continues its usual rate of progress in good-looking vein material. A north drift started from this main west drift is in 45 feet—same material.

YELLOW JACKET.—Daily yield 50 tons low-grade ore. The explorations of the 1400 level through the incline and main north level show nothing of interest as yet.

CROWN POINT AND BELCHER.—Daily yield 150 tons from the 1600, 1700 and other levels above. The old stops hold out well and are liable to for years to come.

EAST BEST AND BELCHER.—Repairing shaft and hoisting works building preparatory to the energetic resumption of work.

JUSTICE.—350 level—Some rich gold ore was found last Tuesday in the south drift. The vein is four feet wide and gives very high assays.

NORTH GOULO AND CURRY.—Commenced to sink and reopen the shaft with two shifts of men. Everything working favorably.

ANDES.—230 level—The repairs and cleaning out of the main west drift makes good progress.

SILVER STAR.—A first-class new whim for hoisting purposes is being put up over the shaft.

KENTUCK.—Daily yield 50 tons, principally from the 800 level and contiguous points.

OCCIDENTAL.—The north drift from the north incline winze, 48 feet below the track floor of the upper tunnel, has been advanced to a total extent of

51 feet. About 18 tons of low-grade ore have been extracted during the week. The upraise above the lower tunnel has been advanced 10 feet, making a total of 28 feet.

Dun Glen District.

A PROBABLE SALE.—*Silver State*, Dec. 23: There is a probability of the Thomas & Hendra mill and mine at Dun Glen being sold to an Eastern company. The owners are not at all anxious to dispose of it, but will sell if they get their price. The mine is worked exclusively for gold, and there is no discount on that metal.

Mount Rose District.

CONCENTRATIONS SHIPPED.—*Silver State*, Dec. 27: E. Reinhart & Co. shipped 28,200 pounds of concentrated ore from the Paradise Valley mine, to Argo, Colorado, yesterday.

Mt. Cory District.

AT WORK.—*Walker Lake Bulletin*, Dec. 29: There are now 19 men employed in the Mount Cory mine. Nearly all the assessment work has been done in the district. Lew Finney has been doing holding work on the Enterprise, Jumbo and Webfoot. The North Star mine is looking very well at present. There is a 4½-ft. ledge of \$45 ore. W. H. Adams, of Bodie, will soon become a resident of Coryville and will do the assaying for the company and for others.

Ophir District.

BULLION.—*Belmont Courier*, Dec. 25: The Chicago Mining and Reduction Company shipped four bars of bullion on Monday, valued at \$4186.18. The output of bullion from this company's mine in Ophir is steady. The mine is looking well and is being worked in a systematic manner under the able management of Superintendent T. A. Oliver.

Pioche District.

BRIGHTER DAYS.—*Pioche Record*, Dec. 24: There certainly seems a warmer current of air hovering in the atmosphere over Pioche just now. Poor old crippled Pioche, once the gem of the sagebrush country! Is she about to emerge from the long and dreary night of inactivity that has oppressed her? We fervently wish so. Whether or no the benign influence of the sun's rays, or maybe the sound of running machinery and the tooting of whistles have a tendency to render the atmosphere more genial, there is one thing that is quite evident—the pulses of the old camp are quickening a little day by day.

Tuecarora District.

BELLE ISLE.—*Times-Review*, Dec. 24: Belle Isle and Navajo joint crosscut west, 150-foot level, has been extended 25 feet. Joint crosscut east, same level, has been extended 5 feet. The rock has been very hard.

TORNAOON CUL.—They have started a cut on the other side of gulch to intercept ledge at that point, which will greatly facilitate sinking on ledge.

NEVADA QUEEN.—For the week, west crosscut from the main gangway, 150-foot level, has been advanced 39 feet; total from turn-table, 54 feet. Have cut several small seams, from which comes a regular flow of water. No. 1 shaft has been sunk 16 feet; total depth, 156 feet.

NORTH BELLE ISLE.—North gangway, 300-foot level has been advanced 38 feet. North gangway, 400-foot level has been advanced 17 feet. Water has increased very materially during the week.

Union District.

VEACH SERIES.—*Belmont Courier*, Dec. 22: It is expected that the Veach series of mines in Union district will soon pass into the hands of Cincinnati capitalists, who will work them for what they contain, and not as a stock gamble. If the holders of mines in Union district would only sell at reasonable figures, numerous companies would be operating there to-day.

ARIZONA.

* AZTLAN MILL.—*Prescott Courier*, Dec. 23: Douglas Gray is listing mines that are liable to furnish rock and ores for treatment at the Azatlan mill, Grom Creek. Mr. Jones has, we hear, purchased the mill and intends to add to it every appliance necessary to the successful reduction of ores of all kinds. Sam Powell has of late turned his attention to prospecting banks and bars on the Hassayampa, and assures us that the gravel pays from 2 to 10 cents to the pan. Just now there is not sufficient water to wash the gold out, but the claims are ready and will be worked by the hydraulic process as soon as water comes. Col. Bigelow has sent in to Bones' ore room a very large boulder from the Cany mine, Hassayampa district. This mine has been tested enough to know that its material will pay to work. The *Courier* is now pretty well satisfied that sampling works will be erected and run in Prescott, and that the freight tariff on rich ores will be reduced so as to enable miners to ship ores that will pay \$60, maybe \$50 per ton. Heretofore they have been unable to send away for treatment ores of less value than \$100 per ton. N. L. Griffin is down from Walker district. He tells us that Mr. Moore and his partner will shortly ship to Colorado several tons of ore that will pay \$400 per ton silver. He is confident that the Howell works will be fixed up and run next spring. A lot of sacks were sent to the Catocin mine yesterday and a large shipment will soon be made. Placer miners sent in \$3000 worth of dust last week. This amount was saved in rockers.

IDAHO.

THE MONTEZUMA.—*Wood River Times*, Dec. 26: D. J. Johnston, who leased the Montezuma mine, adjoining the Guy, from Cecil B. Palmer, some months ago, has succeeded in uncovering a pay streak that promises exceedingly well. It was not much thicker than a knife-blade at first, but in running along it a few feet the streak widened out to fully 10 inches, and is still widening. Mr. Johnston brought in about one and one-fourth tons last week, for a sample. It sold at the rate of 180½ ounces silver and 33 per cent lead per ton. He intends to ship a carload lot soon.

THE MINNIE MOORE MINE.—It is stated that, with the payments made since the 1st instant, all the debts outstanding against the Minnie Moore mine have been paid off. These, as far as can be ascertained, exceeded \$300,000, and they have been paid since last June, or within six months. Besides the debts, a large profit has doubtless been realized

by the owners—so that the net yield for the six months just passed may safely be placed at \$500,000. Half a million dollars! That is a splendid showing indeed, and one that will go far toward rehabilitating Wood River in the estimation of investors. But the best is yet to come, because the Minnie Moore is scarcely opened yet. When fully opened, its yield will probably reach half a million dollars per month.

THE GUY MINE.—A letter received from Toledo, Ohio, three days ago, made inquiries concerning the cost of work, including the machinery required to sink the Guy mine to a depth of 500 feet, and stated it to be the purpose of the principal owner, Fred J. Scott, to come out here early next spring, to begin the work of systematic exploration of the property. The Guy is located at the head of Rock creek, near the Montezuma, Belle of Idaho, and other well-known claims, and is good property. Several lots of high-grade ore have been extracted from it, which sold for several hundred dollars per ton.

COLORADO

REO MOUNTAIN MINES.—*Cor. La Plata Miner*, Dec. 20: At the Guston great activity is noticed. It is being worked under the able management of Mr. Wm. Gray, with Harry Ellis as foreman. The company at present employs 30 men, which force is well distributed, in sinking the main shaft, drifting on the third level and cutting a chamber for the new boiler. No ore is being taken out, but the quantity in the stopes is immense, and look out for large shipments in the spring.

THE VANDERBILT MINE.—Since this mine relapsed into the hands of the original owners, it has steadily improved in both grade and quantity of ore. Perry Terpenning is now in charge. The property will be equipped this winter with a fine plant of hoisting machinery, as the shaft is getting too deep to windlass with profit.

MONTANA.

NOTES.—*Inter-Mountain*, Dec. 23: The Elm Orlu mine, owned by W. A. Clark, is said to be a veritable bonanza. The North Granite is looking very well. The tunnel is in about 175 feet. There are good indications, but there is no stock on the market. A rich strike is reported in the Pilgrim mine in the Cherry Creek district. The property is owned by the Bozeman Gold and Silver Mining Co. Elling & Morriss are the fortunate possessors of several promising mines at Poney, and are getting a supply of ore ready for reduction in their mill, which is run by water power. The Golconda, in Madison county, is quite well developed and the ore in sight is variously estimated at from 10,000 to 15,000 tons, much of which is high grade though somewhat base. At Clark's Colusa, in Meaderville, the hoisting works have been temporarily closed to admit of needed repairs in the boilers and parts of the machinery. During the time occupied in this work the shaft will be trimmed up and timbered to the bottom, and the mine placed in good shape for another long run. There is a magnificent lot of ore on dump, and the smelters will be kept busy at work.

THE PARROTT SHAFT.—*Butte Miner*, Dec. 25: A *Miner* reporter yesterday visited the Parrott mine and learned that at present, in addition to mining 275 tons of good ore per day, the superintendent was working three shifts of men sinking an additional 200-foot shaft, which he hopes to have completed by the first day of May, 1887. This shaft will be timbered throughout in best style. When completed, the total depth of the Parrott will be 630 feet and then crosscutting for the lead will proceed and the mine fully developed. The Parrott is beyond doubt one of the best timbered mines in Montana, and its condition is due wholly to the excellent judgment of Superintendent Tibbey, who has had the management of it since May, 1881.

NEW MEXICO.

MINING SITUATION.—*Socorro Bulletin*, Dec. 23: The attention which the mines of Socorro county and of New Mexico generally are receiving in the East exceeds that of any time in the history of this Territory. There are not less than '20 mining deals on foot in St. Louis alone, at this time, in which Socorro county properties are involved. Two European syndicates are also interesting themselves in our midst, and in summing up to the total amount involved in these negotiations it makes a sum exceeding \$700,000 cash. If we do not enter into details it is due to the fact that a number of these negotiations are still under way, and by giving them publicity we might put the back-capper on the alert and thus nip in the bud the progress of legitimate business transactions, and the development, in the vicinity, of meritorious mining claims.

UTAH.

REVIEW.—*Salt Lake Tribune*, Dec. 24: The receipts in this city for the week ending the 22d instant, inclusive, were light, being to the value of but \$26,357.53; of bullion, \$72,822.66; of both, \$99,180.19. For the previous week the receipts were \$141,338.35 in bullion and \$45,989.93 in ore, a total of \$187,328.28. The output of the Ontario for the week was 17,734.20 ounces fine bullion, and \$8704.46 from ore sales, a total of \$26,438.66. The Daly produced for the week seven bars of bullion, 9866.51 fine ounces. No ore sales. Fine bar receipts for the week were \$30,682.66; base bullion, \$12,300. The Hanauer smelter product for the week was \$23,510 in bullion. The Bannock sent down two shipments of bullion during the week, of the aggregate value of \$3776. The Stormont sent up on the 18th silver bars to the value of \$2554. Ore receipts in this city for the week were \$11,800 by Wells, Fargo & Co.; \$11,285 by McCormick & Co.; \$3272.53 by T. R. Jones & Co.

ORE AND BULLION SHIPMENTS.—During the week the Macintosh sampler received 245,790 pounds of Ontario ore, 230,390 pounds of Daly and 11,280 pounds of Sampson ore; total, 487,460 pounds. The Ontario shipped during the week 29 bars of bullion, containing 17,734.20 fine silver ounces. The output of Daly bullion from the Marsac mill was 7 bars on the 20th instant, containing 7790 fine ounces of silver, and yesterday the product was 6 bars, containing 6788 fine ounces.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 252 Market St., S. F.

OR WEEK ENDING DECEMBER 21, 1886.

354,691.—SAW SETTER AND SHARPENER—J. P. Cobb, College City, Cal.

354,703.—SHINGLING SEAT—C. B. Huestis, Ukiah, Cal.

354,654.—SHEET METAL SEAMING MACHINE—Chas. Puddefoot, S. F.

354,809.—AMALGAMATOR—Rowe, Holmes & Wells, Eureka, Cal.

354,873.—CABLE GRIP—C. T. Ryland, Jr., San Jose, Cal.

354,667.—MOTOR—G. Suuo, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SHINGLING SEAT.—Chas. B. Huestis, Ukiah, Mendocino Co. No. 354,703. Dated Dec. 21, 1886. The invention relates to a seat and nail-holder to be employed by workmen in putting shingles upon sloping roofs. The seat differs from what is known as a shingling bracket, as it is independent and movable to any point which may be desired. With this device the operator may move as the work progresses from point to point, having everything necessary for his work with him, and is not dependent upon any fixed staking.

MACHINE FOR SHARPENING AND SETTING SAWS.—John P. Cobb, College City, Colusa Co. No. 354,691. Dated Dec. 21, 1886. This apparatus for filing and setting saws consists of a holder for the saw blades, with a carriage over which it is advanced intermittently a distance equal to the space between the teeth of the saw to be operated on, a file suitably supported, and a means for adjusting it to the proper angle to move it across the line of the teeth of the saw, and a mechanism by which the teeth are set.

MOTOR.—Gustave Sutro, S. F. No. 354,667. Dated Dec. 21, 1886. This improvement in motors is especially adapted for that class which are to be used on street railways where it is desirable to reduce the noise of escaping steam and smoke from the products of combustion as much as possible. It consists of an engine and boiler, the discharge from the exhaust engine and safety valve being conducted into a peculiarly constructed box and passages having baffles plates to check it. By the means employed the noise of the escaping steam will be so muffled and deadened that it will not frighten horses or produce a disagreeable result.

RAILWAY CABLE GRIP.—C. T. Ryland, Jr., San Jose. No. 354,873. Dated Dec. 21, 1886. This grip for cable cars consists in jaws having the outer edges binged or journaled in a suitable framework, and the inner edges formed or provided with shoes, which are adapted to grasp the cable when the edges of the jaws are moved toward each other in a segment of a circle turning about their hinges or journals. In connection with these jaws are adjustably flanged rollers, which serve to pick up the cable and direct it so that the jaws may grasp it. The operating shank travels in guides extending downwardly from the car to the grip frame, and this shank is connected with the inner edges of the gripping jaws by links, so that when drawn upward the jaws will be closed and when dropped they will be opened.

SEAMING MACHINE FOR SHEET METAL.—Chas. Puddefoot, Oakland. No. 354,654. Dated Dec. 21, 1886. This invention relates to that class of machines which are used for joining the edges of sheet metal together and which are usually known as "seaming machines." The particular seam which this machine is adapted to make is the ordinary one made by bending the edges of the two plates or sheets in opposite directions and then pressing them together over and down to a flat plane, in which the two edges are interlocked. The invention consists in an upper and lower die stock carrying various bars and anvils, and to which movements and adjustments are given by which the overlapping edges of the two sheets or the opposing edges of the same sheet are first bent in opposite directions, then brought and held together, and finally pressed over and down flat to form the seam.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.
G. W. INGALLS—Arizona.
E. L. RICHARDS—San Diego Co.
R. G. HUSTON—Montana.
GEO. McDOWELL—Fresno and Tulare Cos.
J. C. SWEENEY—Sonoma and Mendocino Cos.
O. F. BEROMAN—Yolo and Solano Cos.
M. S. PRIME—El Dorado and Placer Cos.

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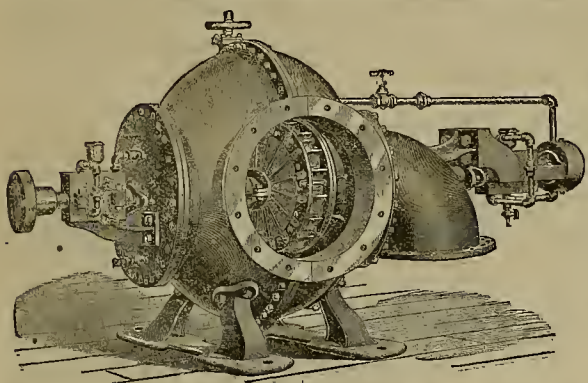
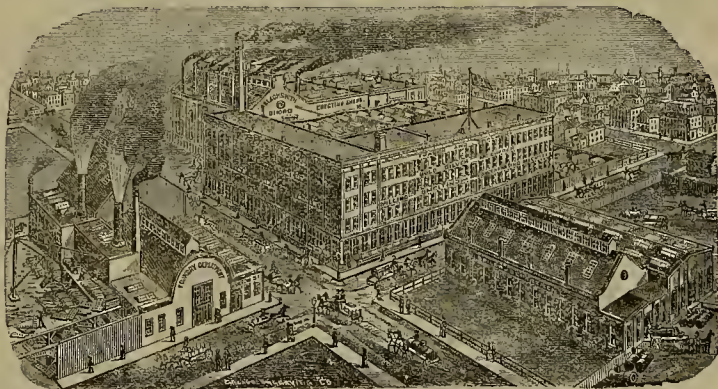
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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.
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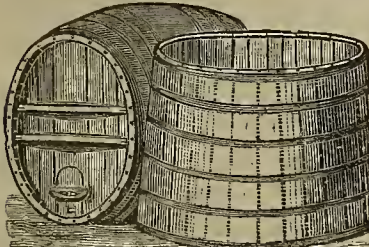
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IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

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Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.
BEST SOFT LAKE SUPERIOR COPPER USED.

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

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These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.
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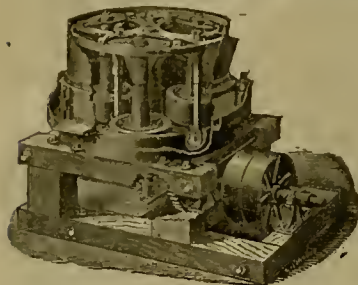
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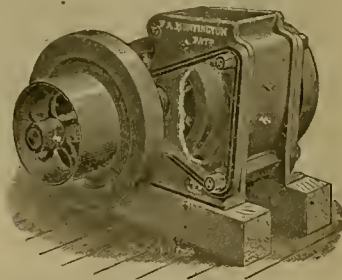
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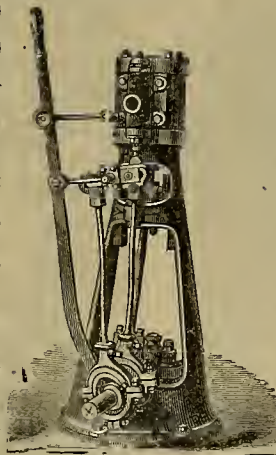
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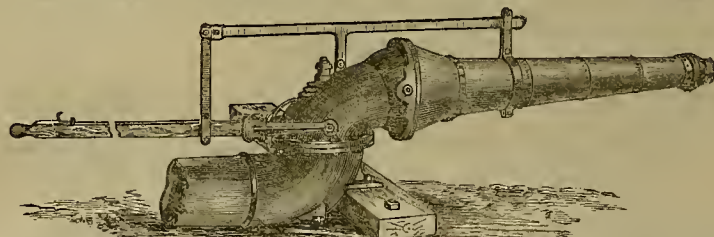
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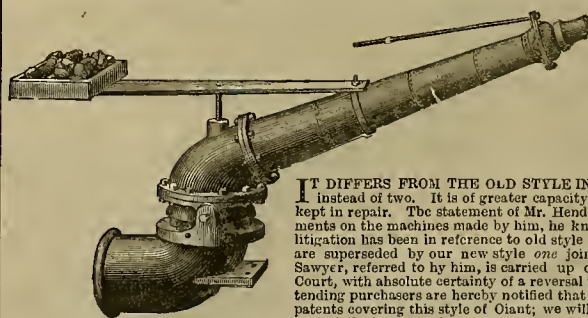


The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

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IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Miners and intending purchasers are hereby notified that we are the sole owners of the patents covering this style of Giant; we will prosecute to the fullest extent of the law manufacturers or users of an infringement.

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Orders Promptly Executed

Mining Share Market.

Christmas was followed by rather a sharp break in stocks, some of them going down quite low. The leading producing mines are still, however, selling at good prices. The fire in the Con. California and Virginia has occasioned considerable trouble, mainly from gases. This fire in the worked-out bonanza stopes was cut into by an exploring drift on the 1600 level. It has been securely bulkheaded at that point, but the fresh draft of air it received revived that old fire very materially, so that it has been an arduous job to again hermetically segregate it so to speak, as it was before. It is no easy matter for men to work in drifts full of deadly carbonic acid gas, and more than one or two cases of asphyxiation occurred. Big wet sponges, covering the mouth and nostrils, and even Van Dusen bead-pieces or helmets, same as was used by Van Dusen when he went to the rescue of the miners shut into a drift in the lower levels of the Alta mine four or five years ago, were called into requisition in the arduous work of bulkheading out the fire and the gas. But incessant vigilance and excellent management have at last overcome this temporary difficulty. The only points affected by the gas are the 1650, 1500 and 800 levels. The gas is now being handled so that but little further trouble is expected. Work will therefore go on as before. At the Ophir the operations have been confined to bulkheading the connections with the Consolidated California and Virginia old stopes and repairing drifts. This shows that little or no progress toward the development of ore has been made in the Ophir mine.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

RIVERSIDE LIGHTING CO., Dec. 24. Object, lighting and heating of the town of Riverside, San Bern rmo county. Capital stock is \$40,000. Directors—H. M. A. Miller, W. B. Cline, C. O. G. Miller, J. M. Livingston, Joseph Hutchinson.

NATIONAL CITY AND OTAY R. R. CO., Dec. 28. The route of the road is from National City, San Diego Co., to Otay, Cajon, Chollar and Spring Valley, 50 miles. Capital stock, \$100,000. Directors—W. G. Dickinson, Frank A. Kimball, Warren C. Kimball, Samuel J. Bailey and Charles L. Josselyn.

MOORE & MORGAN M. CO., Dec. 29. Capital stock, \$10,000,000. Directors—James H. Crossman, R. Clute, J. H. Sayle, William Dutch and Nahum Mason.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Cou. California and Virginia, Dec. 26, \$85,000; Eureka Con., 29, \$17,000; Alice, 24, \$21,648; Moulton, 24, \$19,200; Hanauer, 21, \$5,150; Bannock, 21, \$19,400; Hanauer, 23, \$24,300; Alice, 25, \$9,042; Hanauer, 24, \$23,500; Stormont, 24, \$27,600; Queen of the Hills, 24, \$44,500; Hanauer, 25, \$4,800; Bannock, 25, \$3,550. The metal shipments out of Salt Lake City for the week ending Dec. 25 (short a day on account of Christmas) were 14 cars of bullion, 355,688 lbs.; 6 cars lead, 173,600 lbs.; 12 cars silver ore, 405,850 lbs.; 7 cars copper ore, 199,000 lbs.; total, 39 cars, 1,134,138 lbs. In bullion Wells, Fargo & Co. shipped \$54,786; McCormick & Co., \$41,725; and Jones & Co. \$32,724.

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Dec. 30, 1886.

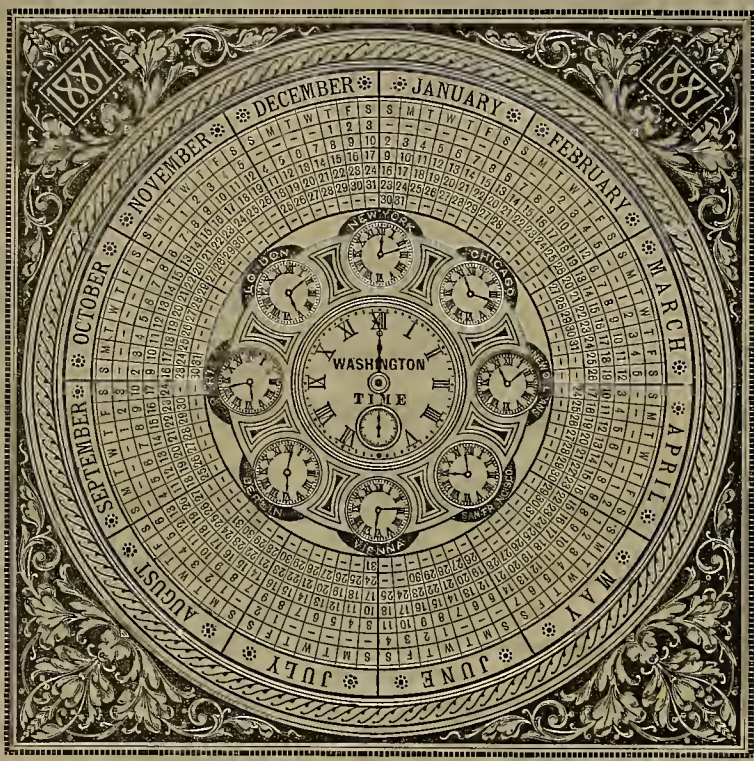
ANTIMONY—French Star.....	9 1/2 @
BORAX—San Bernardino.....	8 @
Atimago.....	6 @
IRON—Bangkok ton.....	23 00
Eginton, ton.....	22 00
American Soft, No. 1, ton.....	24 00
Oregon Pig, ton.....	21 00
Chippewee, Nos. 1 & 4.....	22 00
Clay Lane White.....	21 50
Shorts, No. 1.....	23 50
COPPER—	
Bolt.....	25 @
Sheeting.....	16 @
Ingot.....	12 @
LEAD—Pig.....	4 75 @
Bar.....	5 25 @
Sheet.....	8 @
Shot, discount 10% on 500 bag Drop, 1/2 bag.....	1 65 @
Buck, bag.....	1 35 @
Chilled, do.....	2 05 @
ZINC—German.....	8 @
Sheet, 7x3 ft, 7 to 10 lb, less the cask.....	6 1/2 @
QUICKSILVER—By the flask.....	35 50 @
Flask, old.....	1 05 @
Flask, old.....	85 @
TINPLATE—Coke.....	4 90 @
Orchard.....	6 25 @
STEEL—English, B.....	14 @
Black Diamond, ordinary sizes.....	10 @
Plow.....	4 @
Machinery.....	5 @
Sanderson Bros.....	10 @

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

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Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.



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COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Centennial Gravel M Co.....	Nevada.....	27.....	02. Oct 25. Dec 6.....	Jan 6. J. P. Flanagan.....	Virginia Nev
Chollar M Co.....	Nevada.....	22.....	50. Nov 15. Dec 21.....	Jan 13. O. E. Elliott.....	309 Montgomery St
Caledonia S M Co.....	Nevada.....	41.....	15. Nov 26. Dec 23.....	Jan 19. A. S. Groth.....	414 California St
Champion M Co.....	California.....	23.....	10. Nov 29. Jan 7.....	Jan 23. T. Wetzel.....	552 Montgomery St
Columbus Con M Co.....	Nevada.....	5.....	30. Dec 22. Jan 27.....	Feb 18. J. M. Buington.....	309 California St
Dictator Con M Co.....	Nevada.....	1.....	01. Dec 15. Jan 22.....	Feb 12. J. F. Boller.....	Hawthorne Nev
Gorla M & M Co.....	California.....	4.....	06. Nov 26. Dec 31.....	Jan 21. A. A. Enquist.....	436 Montgomery St
Golden Fleeco G M Co.....	California.....	7, 10.....	06. Nov 22. Dec 27.....	Jan 15. W. J. Gleason.....	Phelan Block
Golconda M Co.....	California.....	2.....	03. Dec 22. Jan 27.....	Feb 16. J. M. Buington.....	309 California St
Live Oak D G M Co.....	California.....	4.....	10. Dec 7. Jan 15.....	Feb 5. T. Wetzel.....	522 Montgomery St
Mides G & S M Co.....	Nevada.....	3.....	25. Dec 16. Jan 22.....	Feb 10. T. W. Newlin.....	230 Montgomery St
Mayflower Gravel M Co.....	California.....	35.....	25. Nov 19. Dec 22.....	Jan 17. J. Morio.....	328 Montgomery St
North Sierra Nevada M Co.....	Nevada.....	4.....	20. Nov 26. Jan 21.....	Jan 24. J. L. Fields.....	330 Pine St
Orelands Con M Co.....	Nevada.....	1.....	05. Dec 6. Jan 12.....	Feb 2. J. Stadfeld Jr.....	419 California St
Phœnix Con M Co.....	California.....	1.....	08. Dec 6. Jan 13.....	Jan 31. C. Colishoff.....	516 California St
Peerless M Co.....	Arizona.....	9.....	10. Nov 16. Dec 23.....	Jan 17. A. Waterman.....	332 Montgomery St
Peer M Co.....	Arizona.....	6.....	10. Nov 12. Dec 22.....	Jan 7. A. Waterman.....	309 Montgomery St
Potosi M Co.....	Nevada.....	30.....	10. Nov 10. Dec 14.....	Jan 4. C. E. Elliott.....	304 Montgomery St
Polar Star M Co.....	New Mexico.....	1.....	07. Nov 17. Dec 31.....	Jan 15. J. C. Stump.....	339 Montgomery St
Renton Coal M Co.....	Wash Ter.....	7.....	20. Oct 20. Dec 6.....	Jan 5. J. H. Henderson.....	24 Sansome St
Spring Valley G M Co.....	California.....	6.....	25. Oct 19. Dec 22.....	Jan 8. H. Pichoir.....	320 Sansome St
Sierra Iron Co.....	California.....	6.....	25. Nov 18. Dec 22.....	Jan 18. H. P. Bush.....	431 California St
Summit M Co.....	California.....	9.....	10. Nov 24. Dec 29.....	Jan 18. G. W. Sessions.....	339 Montgomery St
Scorpion M Co.....	Nevada.....	20.....	10. Nov 11. Dec 17.....	Jan 7. G. R. Spiney.....	313 California St
U. S. M Co.....	Nevada.....	54.....	01. Nov 20. Dec 24.....	Jan 15. A. H. Fish.....	393 Montgomery St
Yosemite Queen M Co.....	California.....	2.....	02. Dec 4. Jan 11.....	Feb 1. H. C. De Landresse.....	628 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Alaska M & M Co.....	Nevada.....	E. F. Stone.....	306 Pine St.....	Annual.....	Jan 12
Bullion M Co.....	Nevada.....	R. R. Grayson.....	327 Pine St.....	Annual.....	Jan 13
Crocker M Co.....	Arizona.....	A. Waterman.....	328 Montgomery St.....	Annual.....	Jan 17
Idaho G & S M Co.....	Idaho.....	F. W. Sumner.....	328 Montgomery St.....	Annual.....	Jan 17
Kinsaid Flat M Co.....	California.....	T. V. O'Brien.....	412 Montgomery St.....	Annual.....	Jan 10
Silver King M Co.....	Nevada.....	J. Nash.....	328 Montgomery St.....	Annual.....	Jan 11

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Martin White M Co.....	Nevada.....	J. J. Scoville.....	309 Montgomery St.....	25.....	Dec 20
Paradise Valley M Co.....	Nevada.....	W. Letts Oliver.....	323 Montgomery St.....	10.....	Nov 30
Silver King M Co.....	Arizona.....	J. Nash.....	328 Montgomery st.....	25.....	Dec 15

New York Metal Market.

Telegraphic advices dated Dec. 30th give the following New York prices:

BAR SILVER—\$1.99 1/2 per oz.
BORAX—5 1/2 @ 5 1/4 c.
COPPER LAKE—\$11 1/4 @ \$11 1/2.
IRON—No. 1, \$18.50 @ \$19.50.
LEAD—\$4.85 @ \$4.95.
QUICKSILVER—52 1/2 @ 53 c.

The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Dull, spot closing at 11.70 @ 12.15. Transferable Notices (Lake) issued at 11.85. Transferable Notices (Chili Bars) issued at 13.25. 6d.

LEAD—Quiet and steady at \$4.15 @ 4.45 spot. Transferable Notices issued at \$4.33.

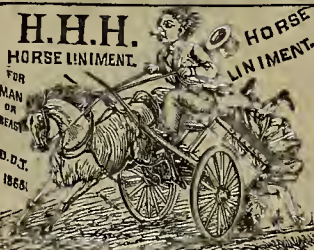
Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.40 @ \$22.50; Billiton Tin, \$23.00 @ \$23.10; Banca Tin, \$23.00 @ \$23.50; Baltimore Copper, \$10.75 @ \$10.95; Orford Copper, \$10.75 @ \$11.00; P. S. C. Copper, \$10.50 @ \$11.00; Foreign Lead, \$4.40 @ \$4.80; Foreign Spelter, \$4.35 @ \$4.75. MAKER'S PRICES—At tidewater, 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$20.00 @ \$20.50; No. 2, \$18.50 @ \$19.00; Grey Forge, \$17.00 @ \$18.00. Hudson River, Grade No. 1, \$19.50 @ \$20.50; No. 2, \$18.50 @ \$19.00; Grey Forge \$16.00 @ \$16.25. Southern, Grade No. 1, \$19.50 @ \$20.50; No. 2, \$18.00 @ \$18.50; Grey Forge \$17.00 @ \$17.50.

NATIONAL ASSURANCE CO., OF IRELAND.

ATLAS ASSURANCE COMPANY, OF LONDON.

BOYLSTON INSURANCE COMPANY, OF BOSTON, MASS.

H. M. NEWHALL & CO., GENERAL AGENTS, 309 & 311 Sansome St., San Francisco, Cal.



THE H. H. H. Horse Liniment puts new life into the Antiquated Horse! For the last 14 years the H. H. H. Horse Liniment has been the leading remedy among Farmers and Stockmen for the cure of Sprains, Bruises, Stiff Joints, Spasms, Windgalls, Rore Shoulders, etc., and for Family Use is without an equal for Rheumatism, Neuralgia, Aches, Pains, Bruises, Cuts and Sprains of all characters. The H. H. H. Liniment has many imitations, and we caution the Public to see that the Trade Mark "H. H. H." is on every Bottle before purchasing. For sale everywhere for 50 cents and \$1.00 per Bottle.

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Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 9.	WEEK ENDING Dec. 16.	WEEK ENDING Dec. 23.	WEEK ENDING Dec. 30.
Alpha.....	6.50	8.00	4.00	8.00
Alta.....	4.00	5.00	2.15	5.00
Argenta.....	2.10	3.50	1.00	3.00
Belcher.....	7.00	8.50	3.25	7.50
Brophy.....	1.10	1.30	1.25	1.50
Best & Belcher.....	18 1/2	27 3/4	27 3/4	13 1/2
Baltimore.....	3.85	6.50	1.50	3.00
Belle Isle.....	50	1.00	30	40
Bodie Con.....	3.30	4.50	1.05	4.00
Benton.....	1.25	1.90	1.50	1.10
Bodie Tunnel.....	1.50	2.50	1.60	1.50
Bulwer.....	3.25	55	27	32
Con. Va. & Cal.....	3.00	10	1.90	5.00
Challenge.....	8.00	3.30	7.50	3.00
Chollar.....	13	16	15	10
Confidence.....	2.00	3.10	4.00	1.70
Con. Imperial.....	1.00	1.35	1.60	1.50
Caledonia.....	55	65	40	55
Con. Pacific.....	7.00	9.00	4.00	6.50
Crocker.....	1.00	1.30	1.65	1.90
Central.....	1.50	1.80	1.50	1.50
Dudley.....	1.75	80	25	25
East B. & E.....	1.75	2.25	2.25	2.00
Eureka Con.....	7.50	9.00	4.00	2.00
Exchequer.....	3.15	3.60	1.00	3.15
Grand Prize.....	3.50	1.00	1.35	1.25
Gould & Curry.....	104	14	3.00	5.25
Hale & Norcross.....	7.25	9.00	3.00	4.25
Holmes.....	3.00	3.25	4.00	3.00
Independence.....	45	60	35	45
Iowa.....	1.25	2.50	1.00	2.25
Julia.....	2.00	3.00	1.10	1.35
Justice Point.....	3.25	4.00	1.90	2.62
Kentuck.....	1.50	1.50	1.50	1.50
Lady Wash.....	1.00	1.35	1.50	1.10
Martin White.....	3.75	4.00	2.75	2.65
Mono.....	111	141	25	131
Mt. Diablo.....	3.00	3.50	3.60	3.75
Northern Belle.....	1.40	2.00	1.80	1.75
Navajo.....	5.25	7 1/2	4.25	3.50
North Belle Isle.....	1.60	3.00	2.75	1.45
Nev. Queen.....	1.50	2.25	1.40	1.75
North G. & C.....	7.00	8.00	3.00	4.10
Occidental.....	161	35	8.00	187
Ophir.....	3.00	4.00	1.00	3.00
P. Sheridan.....	11 1/2	14 1/2	3.25	9.00
Potosi.....	1.25	1.50	1.50	1.50
Peerless.....	1.50	1.80	1.45	1.45
Peer.....	1.50	1.80	1.45	1.45
P. Sheridan.....	1.50	1.80	1.45	1.45
Silver Star.....	1.50	1.80	1.45	1.45
Savage.....	1.50	1.80	1.45	1.45
Seg. Belcher.....	1.50	1.80	1.45	1.45
Sierra Nevada.....	1.50	1.80	1.45	1.45
Silver King.....	1.50	1.80	1.45	1.45
Scorpion.....	1.50	1.80	1.45	1.45
Syndicate.....	1.50	1.80	1.45	1.45
Union Con.....	1.50	1.80	1.45	1.45
Yellow Jacket.....	1.50	1.80	1.45	1.45

Sales at San Francisco Stock Exchange.

THURSDAY, Dec. 30.	100	Iowa.....	11
2600 Alta.....	3.50 @ 3.75	200 Justice.....	2.60 @ 2.75
600 Andes.....	1.35 @ 1.40	1000 Julia.....	20 @ 25
300 Alpha.....	3.15 @ 3.25	150 Lady Wash.....	75 @ 80
500 Argenta.....	3.75 @ 4.00	700 Mexican.....	54 @ 60
500 B. & B.....	2.00 @ 2.25	75 Mono.....	2.00 @ 2.25
720 Bodie.....	2.80 @ 2.95	150 Mt. Diablo.....	3.50 @ 3.75
333 Bullion Con.....	2.50 @ 2.65	150 Mt. Cory.....	54 @ 58
1315 Benton Con.....	1.00 @ 1.10	70 N. Belle Is.....	3.45 @ 3.50
170 Belcher.....	3.75 @ 4.00	200 Nev. Queen.....	1.75 @ 1.80
500 Bulwer.....	1.10 @ 1.15	500 Ophir.....	11 @ 12
100 Baltimore.....	75 @ 80	500 Overman.....	1 @ 1.50
100 Con. Pacific.....	25 @ 30	100 Occidental.....	3.75 @ 4.00
1045 Chollar.....	7.75 @ 8.00	100 Peerless.....	85 @ 90
1500 Con. Va. & Cal.....	3.20 @ 3.50	320 Peerless.....	85 @ 90
450 Crown Point.....	4.25 @ 4.50	370 Peer.....	55 @ 60
150 Crocker.....	3.50 @ 3.75	650 Saviour.....	89 @ 92
150 Con. Imperial.....	2.00 @ 2.20	200 Scorpion.....	65 @ 70
500 Andes.....	8.00 @ 8.50	150 Silver Hill.....	50 @ 55
145 Challenge.....	2.25 @ 2.50	100 Spadico.....	25 @ 30
900 Caledonia.....	65 @ 70	650 Sierra Nevada.....	4 @ 5
170 Exchequer.....	1.70 @ 1.75	1100 Union Con.....	34 @ 36
50 Dudley.....	25 @ 30	100 Utah.....	3.75 @ 4.00
800 Gould & Curry.....	5.00 @ 5.50	320 Yellow Jacket.....	5.00 @ 5.50

Golconda Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Calico Mining District, San Bernardino County, California.

NOTICE is hereby given, that a meeting of the Board of Directors, held on the 22d day of December, 1886, an Assessment, No. 2, of three (3) cent shares was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, room 4, 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 27th day of January, 1887, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Wednesday, the 16th day of February, 1887, to pay the delinquent assessment, together with costs of advertising and expenses of

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 per cent., distancing all competitors. Send for Circulars and guaranteed estimates.

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Manufacturers of

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Inserted Tooth

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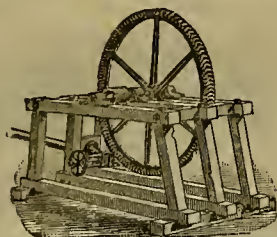
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SAW MILLS AND MACHINERY Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

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ROSS E BROWNE,

Mining and Hydraulic Engineer,

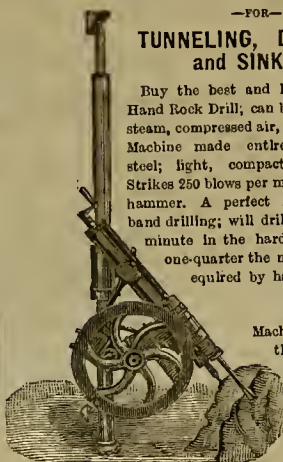
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TUNNELING, DRIFTING, and SINKING.

Buy the best and latest improved Hand Rock Drill; can be run by hand-steam, compressed air, or water power. Machine made entirely of crucible steel; light, compact and durable. Strikes 250 blows per minute with 7-lb. hammer. A perfect reproduction of hand drilling; will drill one inch per minute in the hardest rock, using one-quarter the number of drills required by hand labor.



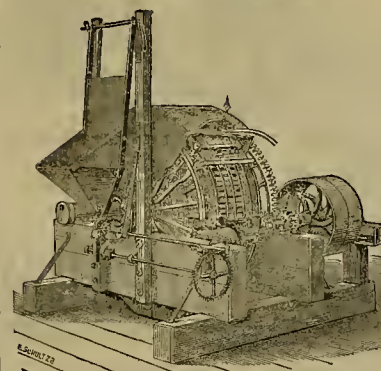
Machines on exhibition at No. 32 First St., San Francisco.

Send for circulars.

GEO. T. EMERY, General Agent.

Tustin's Pulverizer WORKS ORE WET OR DRY

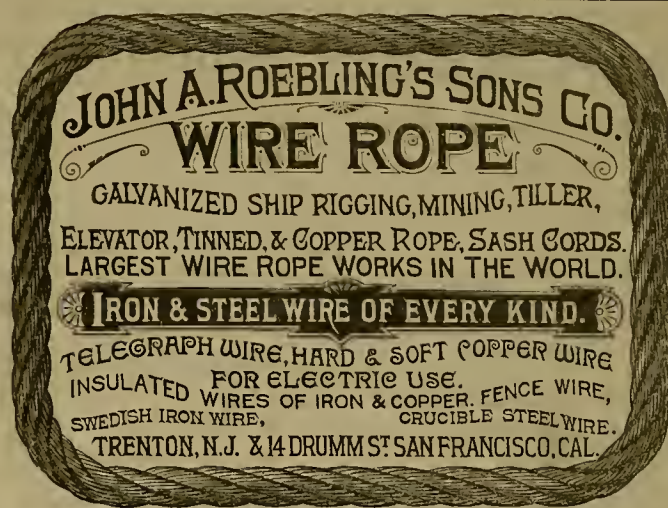
FULTON IRON WORKS, S. F.



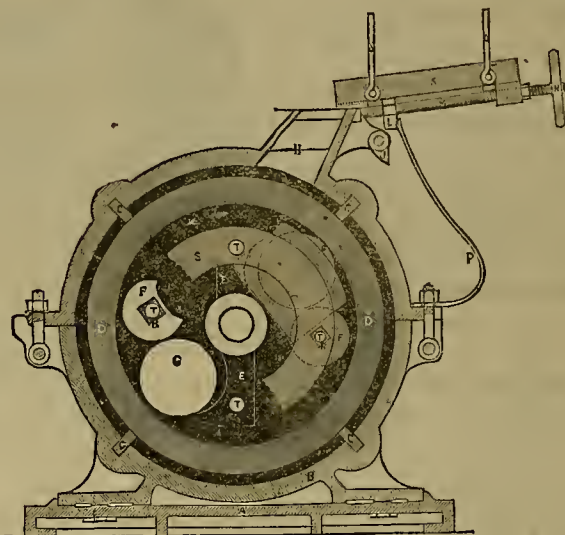
MANUFACTURED BY

HINCKLY, SPIERS & HAYES,

HEALD'S BUSINESS COLLEGE, 24 Post St. S. F. Send for Circular.



THE FRISBEE-LUCOP MILL,



A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied. At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet. All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco. Certificates as to performance of the Mills, and any information required, furnished on application.

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OR PACIFIC IRON WORKS, SAN FRANCISCO.

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—MANUFACTURERS OF—

NITRO-GLYCERINE BLASTING POWDERS.

Vigorit "LOW" Powder,

FOR REMOVING STUMPS AND TREES, HAS NO EQUAL.

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ED. G. LUKENS, Manager.

THE RUSSELL PROCESS COMP'Y.

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Dewey & Co. { 252 } Patent Ag'ts { Market St }



HOISTING ENGINES FOR MINES.

1, 2, or 4 Drums, with Reversible Link Motion or Pat. Improved Friction.

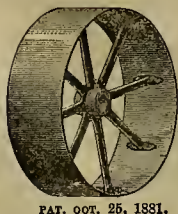
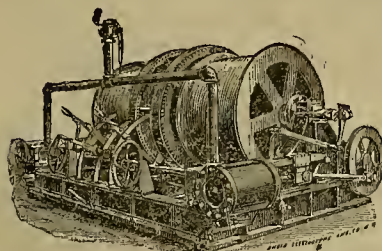
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SAN FRANCISCO.



PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884. CLOT & MEESE,

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For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

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Steam Engines, Flour Mill,
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MANUFACTURERS OF
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Flouring Mills, Saw Mills and Quartz Mills Machinery
constructed, fitted up and repaired.

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Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery
of all kinds at Greatly Reduced Rates.

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Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

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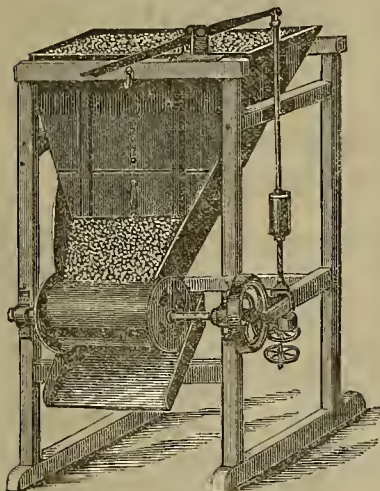
THOMAS THOMPSON THORNTON THOMPSON

THOMPSON BROTHERS,
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129 and 131 Beale St., between Mission and Howard, S.F.

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THE ROLLER ORE FEEDER

[Patented May 23, 1882.]



This is the best and cheapest Ore Feeder now in use.
It has fewer parts, requires less power, is simpler in
adjustment than any other. Feeds coarse ore or soft clay
alike uniformly, under one or all the stamps in a battery
as required.

In the Bunker Hill Mill it has run continuously for two
years, never having been out of order or costing a dollar
or repairs.

Golden State and Miners' Iron Works.
Sole Manufacturers,
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MACHINISTS, ATTENTION!

AN OUTFIT FOR A MACHINIST.

Good Tools, Patterns and an Es-
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FOR SALE AT A BARGAIN,

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Experimental machinery and all kinds of metal, tin,
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HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Cokes having been sold
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This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works,
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to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quanti-
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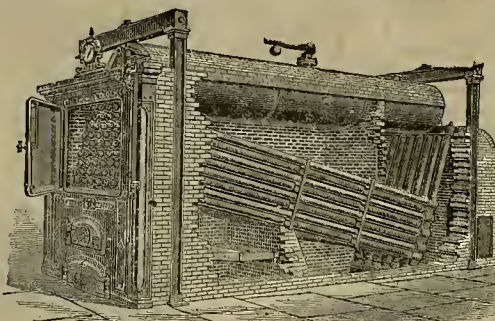
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FULTON IRON WORKS,

HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

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BABCOCK & WILCOX BOILERS.

MARINE ENGINES AND BOILERS—
Propeller Engines, either High Pressure
or Compound, Stern or Side-wheel En-
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MINING MACHINERY—Hoisting En-
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MISCELLANEOUS MACHINERY—
Flour Mill Machinery, Saw Mill Engines
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ENGINES AND BOILERS

OF ALL KINDS,
Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish
Tanks for Salmon Canneries
OF EVERY DESCRIPTION.

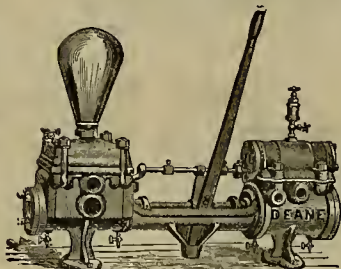
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

Deane Steam Pump.

SPECIALTIES:

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DEANE STEAM PUMP.

PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-
CHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

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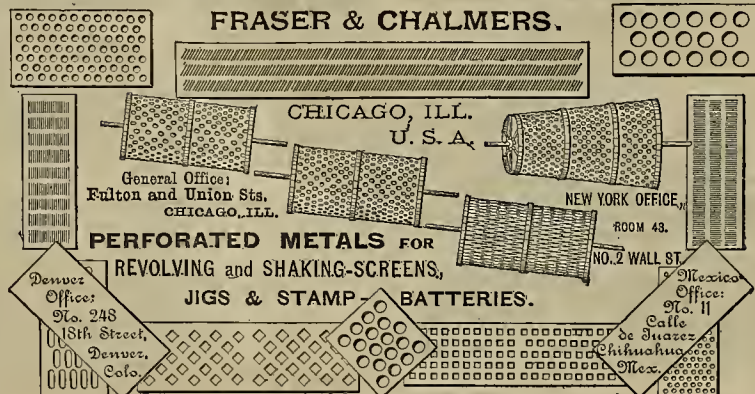
ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shape
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

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TUNNELING, SHAFT-SINKING, ETC.

Engineers' Tables of Progress

WITH MAPS, ILLUSTRATIONS
AND FULL DESCRIPTION OF THE

NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.
SENT FREE ON APPLICATION.

For Catalogues, Estimates, Etc. address:

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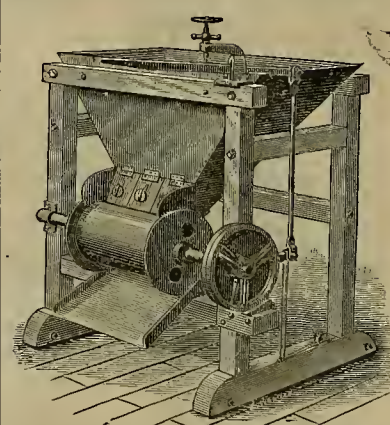
REPRESENTED BY

BERRY & PLACE MACHINE CO.

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,
SAN FRANCISCO, CAL.

THE ORIGINAL Roller Ore Feeder



This form of Ore Feeder is well adapted
for its peculiar work.

In reference to a similar form of "Roller" Feeder,
which is being manufactured and offered for sale in this
city, and of which a cut appears in this journal, we have
to say that the Superintendent of the Bunker Hill Gold
Mining Company states that the "Challenge" is far su-
perior to the "Roller," he having had both of them
operating side by side. We shall be pleased to show this
letter, upon application, to any one interested.

We are also manufacturers of the "Challenge" and
"Standard Improved."

JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont St., San Francisco.

ORE FEEDERS.

We direct attention to an advertisement, which ap-
pears in our journal, of the "Original Roller" Ore
Feeder, manufactured by the "Joshua Hendy Machine
Works," of Nos. 39 to 51 Fremont St., this city.

As the manufacturers of a similar form of Feeder,
known as the "Templeton Roller," claim that it is su-
perior to any other style, and cite those in operation at
the "Bunker Hill" mill in Amador county, we expressly
contradict the statement, and in substantiation submit a
copy of a letter addressed to us by a representative of the
"Joshua Hendy Machine Works," which speaks for itself

BUNKER HILL GOLD MINING CO.,
AMADOR CITY, CAL., July 12, 1886.

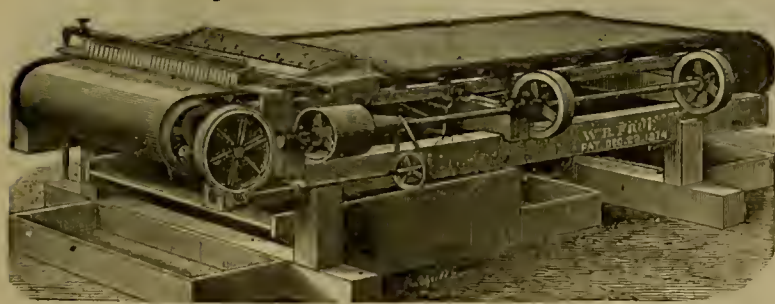
To Joshua Hendy Machine Works, No. 51 Fremont
St., S. F.—GENTLEMEN: We have used the "Challenge"
and "Roller" or "Templeton" Ore Feeders in our mill for
the past three years, and I am free to say that I con-
sider the "Challenge" far superior to the "Roller."
Feeder, in that most important of all things in a quartz
mill, namely, the regular feeding of ore to the bat-
teries. If the "Roller" Feeder is regulated to feed finely
pulverized ore, the coarser ore will choke the outlet
of the Feeder, and no ore can reach the batteries. If, on
the other hand, it is regulated to feed coarse ore, then
the fine ore when it comes will elude right through and
fill the batteries. The "Roller" Feeder requires constant
attention. Yours truly,
(Signed) N. W. CROCKER, Supt.

A CHANCE TO INVEST.

A patent was granted me Sept. 9, 1886, on a STATION
INDICATOR. The design of the invention is to show
passengers on railroads or street cars the names of sta-
tions or streets when or before they arrive at them. A
bell gives warning, and at the same time a hand on a
dial-plate points to the name of the next street or sta-
tion. The working has been tried and proved successful.
The inventor is desirous of forming a company to get
further patents, and to manufacture and introduce the
article in the U. S. of America. For further information,
address,

G. H. BADE,
Prescott House, San Francisco.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS
(\$575.00) F. O. B.**

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), London, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

ADAMS & CARTER.

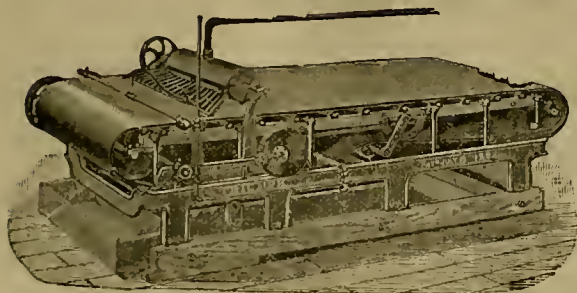
Protected by patents May 4, 1890; December 22, 1874; September 2, 1870; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7, No. 109 California Street,

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\$1,000 CHALLENGE ACCEPTED, PRICE, FIVE HUNDRED AND FIFTY DOLLARS (\$550.00).



**THE
"TRIUMPH" ORE CONCENTRATOR.**

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE, placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

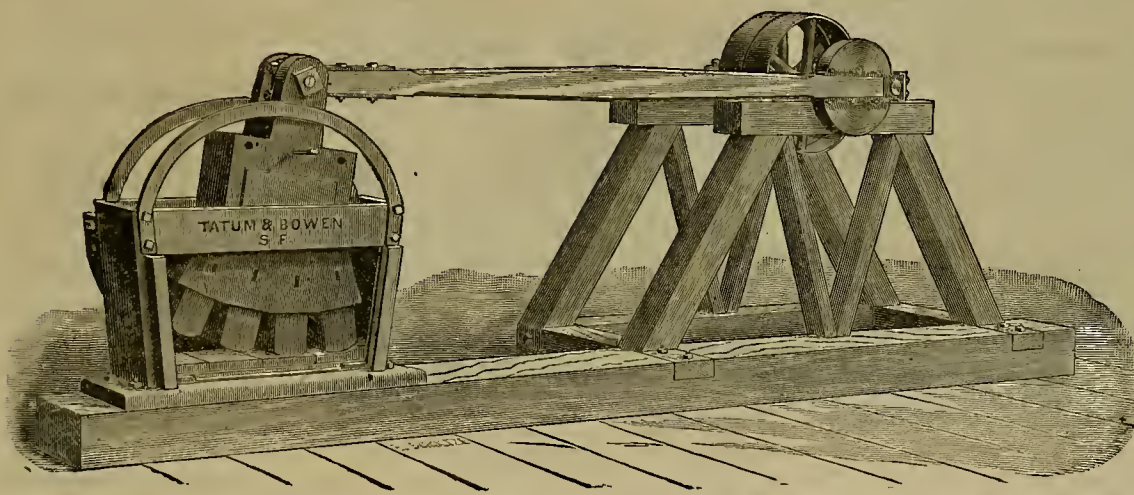
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JAMES' PATENT RECIPROCATING STAMP MILL.

(PATENTED AUG. 16, 1881.)



Weight of Bore and Shoe (1200 pounds) acts on each Shoe separately. It is practically the same as the regular Stamp Mill.

Capacity, 6 Tons in 24 Hours. 4 M. P.

Parties wishing to test the Mill with any ore they may bring, will find one in operation at our works in this city.

PRICES:

Reciprocating Stamp Mill,	\$350 00
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Automatic Ore Feeder, -	50 00
Single Track Ore Car, - -	40 00

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Successors to PRESCOTT, SCOTT & CO.

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SEND FOR LATE CIRCULARS.

COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

San Francisco Cordage Factory.

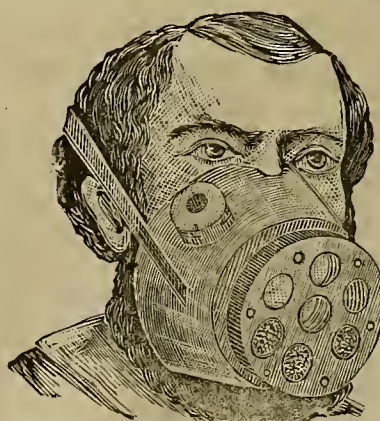
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The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$5.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

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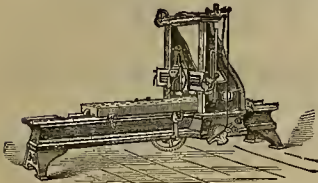
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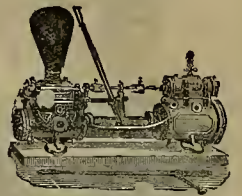


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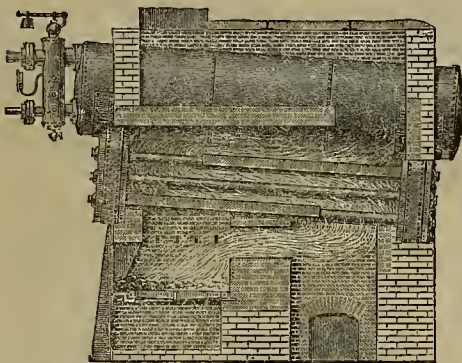
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Location of Works, S. E. Cor. Beale and Howard Sts., San Francisco.

Manufacturers and Sole Agents for the Pacific Coast for

HEINE SAFETY WATER TUBE BOILER.



HEINE SAFETY WATER TUBE BOILER

HAS THE FOLLOWING
ADVANTAGES:

SAFETY,
DURABILITY,
ECONOMY,
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60,000
 HORSE POWER NOW IN USE.

Boilers can be seen working in San Francisco
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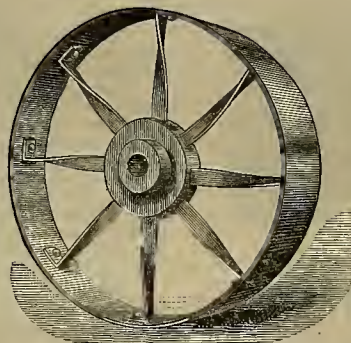
GUARANTEED MORE EFFICIENT
 than any other Boiler made.

Sole Agents Pacific Coast for

FOX'S CORRUGATED FURNACE FLUES,

For BOTH LAND & MARINE BOILERS.
 Rapidly Replacing Old Style.

Over 10,000 now in use. Have just fitted 12
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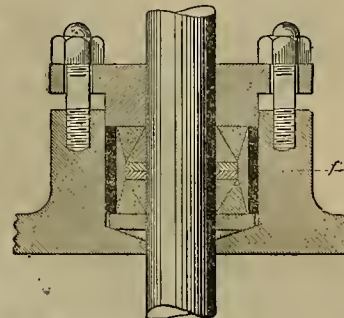
WROUGHT IRON ARMS,

LIGHTEST, STRONGEST AND
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HALF THE WEIGHT OF CAST-IRON

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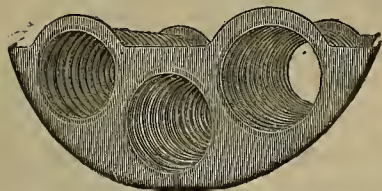
Cannot be Broken in Transportation.



DUDLEY'S Patent Self-Adjusting Metallic Packing

For LAND & MARINE ENGINES.

Call and See It Working.



FOX'S CORRUGATED BOILER FLUES.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

AIR COMPRESSORS—Rope Power Transmission.

HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT-IRON WATER PIPE a Specialty. **NOTE.**—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.

SAW-MILL MACHINERY of all kinds.

STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.

SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.

MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

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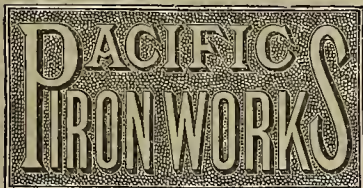
STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

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Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 80-stamp Mill for Quartz Mountain Mining Company.

Send for Circular and Price Lists.



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RANKIN, BRAYTON & CO., BUILDERS OF..... MINING MACHINERY.

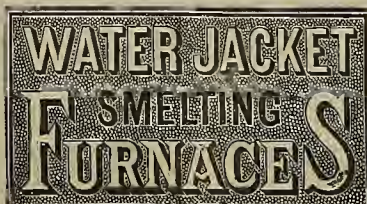
San Francisco: 127 First-Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

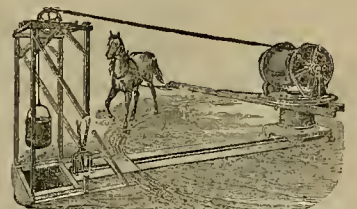
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED AS VALUABLE in this class of work.



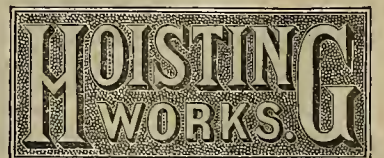
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FUEL being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH of the YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700-pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man at the shaft, and is CAPABLE of CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JANUARY 8, 1887.

VOLUME LIV
Number 2.

Academy of Sciences.

The annual election of the California Academy of Sciences was held on Monday last, at which the following officers for the year were chosen for 1887: President, H. W. Harkness; First Vice-President, H. H. Behr; Second Vice-President, G. Hewston; Corresponding Secretary, A. Ferrer; Recording Secretary, Chas. G. Yale; Treasurer, John Dolbeer; Librarian, Carlos Troyer; Director of Museum, J. G. Cooper. Trustees—Charles F. Crocker, Thomas F. Madden, J. M. McDonald, E. L. G. Steele, S. W. Holladay, D. E. Hayes and E. J. Molera. The only officers of the "regular ticket" elected were Messrs. Madden, McDonald, Charles F. Crocker, Troyer and Yale, the others having run on the "reform" ticket. Many of the oldest officers were deposed. The new officers promise a number of improvements in academy affairs, among them the construction of a new building for the collections. The lease of the present building runs only two years more.

The Treasurer made the following report for the year 1886: Receipts, \$12,357.58; disbursements, \$9912.60. In the General Fund the receipts were \$10,806.56; disbursements, \$8912.60; leaving a balance on hand of \$1893.96.

The Corresponding Secretary, S. B. Christy, reported concerning the correspondence attended to during the year—417 letters sent, 530 received; 1247 copies of the two bulletins published had been delivered to members and societies. Librarian C. Troyer reported that library matters were very active. The academy had received 2401 publications against 960 the previous year. Of these, 1933 were from corresponding societies, 384 by donation, 189 exchange of duplicates and 66 by purchase.

It is but just to state that the large increase was due mainly to the activity of Assistant W. Churchill, who had extensive correspondence with other societies with regard to exchanges, etc. This gentleman has also written about 45,000 cards for the card catalogue of the library this year, and there are now 125,000 cards in the index. Many hundred volumes have been bound of late. The library was never in better condition, and it is to be hoped that this work will be continued until all the subjects are indexed.

Wm. Churchill, secretary of the Board of Trustees, read the report of the Board. This upheld and defended the policy pursued by the officers, stating that the blame for the non-removal of the academy to dryer and more commodious quarters lies with the academy at large, and not with the trustees; because when the trustees desired to move, a committee appointed by the academy to confer with them had opposed moving, and prevailed upon them to remain in the old building awhile longer. This report also detailed the financial statements. It showed that the only salaries paid from general fund were to Mr. Harford, the director of museum, and Mr. Churchill, assistant librarian. From the Crocker Scientific Investigation Fund, Mrs. Mary K. Curran had

received \$40 per month for the year, and Dr. A. Kellogg the same. A small sum was also paid C. D. Gibbes.

The retiring president, Professor Davidson, in his report, stated that during the 19 years he has been connected with the academy he can recall no year where better work has been done, and asserted that the character and not the quantity of the work done is the true measure of a scientific body. He also complimented the younger members for the way they were coming to the front, and spoke of the various contributions to the bulletins.

QUIJOTOA.—We are told that matters are looking up at Quijotoa, Arizona. The Loco-

The Improved Mining Wheel.

We give an illustration on this page showing the application of the James Leffel improved mining wheel, for creating blast in smelting furnaces in the mining region. The wheel is represented as driving a blower for the furnace. As may be inferred from its name, the wheel is more especially designed for furnishing power for mining purposes; yet its completeness and extreme simplicity of arrangement highly commend it as a motive power for any purpose where it is desired to utilize medium and high heads of water. These wheels are frequently placed under heads ranging from 250 to 300 feet, and, in order to prevent the heating of the

Average Yield of Quartz.

A few months since we gave an article which showed the cost of milling gold quartz and the average yield in different parts of the world, and cited several examples of gold milling in California. We are enabled to crush and work gold ore here now at a reduced expense from what was formerly the case. In looking over some old files recently, we saw, however, that quartz was milled for \$4 per ton at Grass Valley, in 1855 and 1856, at company's own mills, though they charged \$6 per ton for custom work. At the mines there, at that time, drifters got \$3.50 per day, foremen \$4, windlassmen \$3, and carmen \$3. Much of the quartz yielded at the mills in those years pretty good figures. Lots from the Missouri Hill yielded as follows: 72 tons, \$40 per ton; 110 tons, \$26 per ton. Sebastopol mine, 27 tons, \$111; 29 tons, \$80; 33 tons, \$60; Allison ranch mine, 21 tons, \$370 per ton; Houston Hill, 22 tons, \$60 per ton; Gold Hill claim, 226 tons, \$23 per ton; 12 tons, \$117 per ton; 61 tons, \$40.30 per ton; 157 tons, \$50 per ton; Osborne Hill claim, 5 tons, \$60.40; Ophir Hill claim, 57 tons, \$180; Massachusetts Hill, 40 tons, \$28; Rose Hill, 120 tons, \$23; Redan Hill, 39 tons, \$26 per ton. All these crushings were made in the Gold Hill mill at Grass Valley, of which Mr. Melville Attwood was manager at the time.

At the French mill, same place, lots of ore yielded as follows: Ophir mine, 146 tons, \$94.43 per ton; Sebastopol, 263 tons, \$39 10; Wisconsin, 58 tons, \$45.12; Rich Hill, 40 tons, \$34; Massachusetts, 90 tons, \$180; and 17 tons, \$140 per ton. At this same custom mill the Mt. Hope lead had 2000 tons crushed which yielded \$55 per ton; different leads on Gold Hill 4000 tons, yielding \$18 to \$20 per ton. The greatest number of veins from which small lots of ore were received, yielded rock which returned from \$12 to \$16 per ton.

Some mills in those days used Stetson amalgamating stirring bowls and quicksilver troughs, though the main dependence was placed on blankets. In front of the sieves was a small trough and then came the blankets, and 75 per cent of all was saved before leaving the blankets. Reference to this blanket process is made in another column. Very little amalgamation was done in the battery in early days at Grass Valley, and no copper plates were used.

SALES OF POWDER in this market last year were about 20 per cent larger than in 1885. This, however, was partly due to low prices. A local trade journal says that the trade for the past year consisted principally in dynamite in various forms, modified to suit the needs of the market. The total quantity of dynamite made during the year was about 6,000,000 pounds. The manufacture of black powder during the year has not exceeded 80,000 kegs. The powder pool will not expire until July.



LEFFEL'S MINING WHEEL ATTACHED TO SMELTING FURNACE.

motive Mining Co. has leased 10 stamps of the Peer and Peerless Mill, and is building a road to the mills. This road will also admit of the Weldon people shipping their ore to the mill. The Peer and Peerless sold out their stock during the rise, which had been taken in for assessments, and have been enabled to pay off their debts.

LICK LECTURES.—During the year it is proposed by the Society of Pioneers to request several gentlemen to deliver addresses, to be known as Lick Lectures, relative to early adventures by land and sea in California. Among others, the following gentlemen have been invited to narrate their experiences: S. J. Field, Lorenzo Sawyer, Ogden Hoffman, Prof. George Davidson, Peter Burnett, Dr. James Simpson and Dr. Washington Ayer. The first lecture was delivered at Pioneer hall this week by John S. Hittel, upon "The Plains and Mines in 1849."

THE issue of standard silver dollars from the mints during the week ended Dec. 31st was 511,666, and during the corresponding period of last year 476,684. The shipments of fractional silver coin during December amounted to \$637,405. The coinage at the mints during December was \$4,814,522, of which 2,550,261 were standard dollars,

journals which would otherwise result from the high speed at which the wheels run, a new device has been applied in the way of anti-friction oil bearings, surrounded by water boxes.

The method of application and connection of the wheel to the work are so clearly shown in the illustration that no further description is necessary. The only requirement is a good, firm foundation on which to place the wheel, which communicates the power direct from a small pulley on the end of water-wheel shaft, by a belt, to a larger pulley on the main line shaft, all intermediate gearing being thus dispensed with. A large number of these wheels are in operation throughout the mining districts, as well as elsewhere in different parts of the country, and have proved themselves durable, easily managed, highly efficient, and economical in the use of water. Full particulars in regard to this wheel, together with a finely illustrated catalogue, may be had by addressing the manufacturers, James Leffel & Co., Springfield, Ohio.

IRON has made a good record in 1886, the imports of wrought scrap iron being 5000 tons larger than in 1885.

New smelting works to cost \$50,000 are to be built immediately at Tacoma, W. T.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Roasting and Leaching of Silver Ores.

Notes of the Practice at Las Yedrae, Sinaloa, Mexico.

NUMBER 2.

[Written for the Press by CARL A. SCHENK.]

In working the ore the long-handled hoe and rakes are supported by an iron roller fastened to the frame of the working door and revolving around a horizontal axis. A hollow space, of rectangular shape, is left out in the masonry of the first hearth, into which the roasted charge is dropped through a circular hole in the floor, which, excepting the short time of dropping the charge, is closed with a cast-iron plate covered over with ore. From the floor of the furnaces the ore is conveyed to lower levels by means of chutes, there to be sprayed over with water before being transferred to the leaching.

The wood used in roasting consists of oak and pine; the sticks are about two feet long and varying in thickness from two inches to half a foot through. The thick pieces are split, but not sufficiently small to correspond in heating and flame-giving effect to the lighter pieces which the workman slings with ease into the fire. Oak is preferred to pine: the first producing in its combustion a clear, yellow flame, which, with a rolling motion, passes through the first hearth between ore and arch, entering about half-way into the second, at and from which point it commences to fade, losing its distinct character. Pine gives a longer flame, not of a clear, yellow color, like that from oak, but mixed with black, sooty streaks, and filling the hearth with smoke, especially in firing up.

A Charge in the Furnace.

After a charge has been dropped from hearth 1, all the others on the hearths behind it are advanced in the process of roasting. Charge from hearth 2 is now moved to 1, charge from 3 is moved to 2, and a new charge is dropped from the hopper into the last hearth, after room has been made for it there. The charges on the different hearths of a furnace differ consequently in regard to the length of time they have been in the furnace and state of roasting. In regard to length of time during which a charge remains on any one hearth, excepting the first, the workmen are to some extent guided by the progress of the work on the first hearth. Under the present system of roasting, it takes about two hours to finish a charge on the first hearth of furnace 1, which has altogether five hearths, not including the time of moving over from 2 and dropping, so that the following practical rule for this furnace has been adopted. A charge in the furnace before it is moved, remains about two hours on any one hearth. Yet it must not be understood from this that the roasting foreman is solely guided by time in judging if a charge should be dropped; by taking samples and noting the physical changes of the ore, he watches principally the progress of roasting and gives his order to drop if the appearance of the last sample informs him that it is time.

An answer to the question of what nature are these physical changes from which he can tell that a charge is done, is difficult, inasmuch as only a practiced eye is quick in observing them, and a description of them is not easy. A sample of finished ore, coming red hot out of the furnace, must assume throughout, in the first stage of cooling off, a lively light coffee-brown color, so that no streaks or specks of unchanged or only partially changed sulphurets can be detected. The raw pulp is of a bluish-gray color. The use of the microscope, or at least the magnifying glass, might be of service here. And the sample of roasted ore, coming red hot out of the furnace and immediately held to the nose, must give up a peculiar, faint smell, sweetish as it is termed. As crude as these tests appear, they are nevertheless valuable in practice, and the best results are obtained whenever these physical changes are noticed in their highest perfection; the silver loss in roasting is small and the percentage of chlorination high.

Considering that the ore contains so much arsen, it may be said without fear of contradiction that the silver loss even in the best case must always be considerable, and the percentage of chlorination comparatively low; the volatile arsenurets disposing the silver also to volatilization and the arsenate of silver not being changed to chloride. These evil effects are increased on account of the fact that the gangue consists mostly of lims, which, in roasting, being converted to sulphate, consumes a proportion of sulphuric acid, which is lost and inactive in the development of chlorine gas.

This following special notes are collected from

A Roasting Experiment.

And may be of interest to the mining public: Furnace 1, containing five hearths in one plane, was selected for the experiment. In making it, a charge was followed from hopper through the furnace till it was dropped from the first hearth. Samples were taken about every half hour and subsequently assayed to ascertain the

loss and percentage of chlorination of silver and the gradual progress in roasting.

First sample.—Taken from hopper at 7 A. M., is of a bluish-gray color and assays 61.02 ounces in silver. The charge of raw ore (without the salt) weighs about 1950 pounds. After being dropped on the floor of the 5th hearth it is spread out in an even layer and the door closed to give the ore a chance of heating up, whereupon it is worked with the hoe.

Second sample.—From hearth 5, at 7:30 A. M., assays 60.36 ounces. Ore has not yet changed color; arch of the hearth dark; ore also dark on its surface, glowing very faintly inside.

Third sample.—From hearth 5, at 8 A. M., assays 58.80 ounces; gives up a slight smell of sulphur; color of the ore not changed; few sparks in passing hoe through it; arch still dark; ore dark on its surface.

Fourth sample.—From hearth 5, at 8:30 A. M., assays 60.30 ounces; sample is dusty; color is changing to light gray; smell of burning sulphur increasing; arch is getting faintly dark red, and in stirring the ore faintly, dark red portions are turned up; the ore moves from the blades of the hoe like running water; more sparks.

Fifth sample.—From hearth 5, at 9 A. M., assays 64.20 ounces; color of ore light gray, giving up strong smell of sulphur; arch is faintly dark red all over; ore, though yet rather dark on surface, shows faintly dark red throughout in being stirred. At 9:15 A. M. charge is moved to hearth 4.

Sixth sample.—From hearth 4, at 9:40 A. M., assays 64.20 ounces; color of sample light gray; very strong smell of sulphur; arch dark red; ore dark red on surface; many sparks in being worked; dusty, runs from the blades of the rakes like water; the pale blue flame of burning sulphur is noticed.

Seventh sample.—From hearth 4, at 10:20 A. M., assays 64.08 ounces; color of sample light gray; ore dusty; very strong smell of sulphur; arch dark red; ore dark red on surface, brighter inside; white fumes are rising in working the ore; is being moved to the 3d hearth.

Eighth sample.—From hearth 3, at 11 A. M., assays 64.56 ounces; color of sample grayish brown, turning again into gray in cooling; smell of burning sulphur much weaker, and fewer sparks; arch dark red; ore dark red on surface, brighter inside; white fumes are rising in working it; 7 per cent of salt is now added and rapidly worked into the ore, whereupon it is left undisturbed for awhile.

Ninth sample.—From hearth 3, at 11:30 A. M., assays 58.56 ounces; color of sample grayish-brown; no smell of burning sulphur; no sparks; arch dark red; ore dark red on surface, brighter inside.

Tenth sample.—From hearth 3, at 12 noon, assays 60 ounces; color of sample light brown, with gray in it; no smell of sulphur; no sparks; arch red; ore red and increasing in bulk; is getting woolly; does not run any more like water before the blade of the hoe; few white fumes are rising out of the ore.

Eleventh sample.—From hearth 2, at 12:45 P. M., assays 59.64 ounces; percentage of chlorination 31.6. Taking of sample delayed on account of moving charge from hearth 3 to hearth 2. Color light brown, with gray in it; no smell of burning sulphur; no sparks; the woolly-looking charge has much increased in bulk; white fumes are rising from the surface of the ore in this hearth, mixing with those carried over by the draught from the first hearth. The ore is continuously worked.

Twelfth sample.—From hearth 2, at 1 P. M., assays 58.02 ounces; percentage of chlorination 30.1; color of sample light brown; white fumes are rising from the woolly-looking ore; arch red; ore red.

Thirteenth sample.—From hearth 2, at 1:30 P. M., assays 58.08 ounces; percentage of chlorination 32.2; color of sample light brown; arch red; ore red and woolly in appearance; fumes rising.

Fourteenth sample.—From hearth 2, at 2:15 P. M., assays 58:20 ounces; percentage of chlorination 47; color of sample light brown; arch red; ore red; fumes.

Fifteenth sample.—From hearth 2, at 2:45 P. M., assays 57.90 ounces; percentage of chlorination, 65.4; sample light coffee brown; moved charge from hearth 2 to hearth 1 at 2:50 P. M.

Sixteenth sample.—From hearth 1, at 3:15 P. M., assays 57.90 ounces; percentage of chlorination 68.4. The ore lies near fire-bridge piled up; arch yellow; ore on its surface red to yellow. Profuse vapors are rising out of the pile.

Seventeenth sample.—From hearth 1, at 3:45 P. M., assays 54.48 ounces; percentage of chlorination 81.9. Charge is moved from fire-bridge at 4 P. M. and banked up on the opposite side of the hearth. Sample shows a light coffee-brown color in cooling.

Eighteenth sample.—From hearth 1, at 4:30 P. M., the banked-up charge lies still on the side opposite to the fire-bridge; assays 53.88 ounces; percentage of chlorination, 85.0; color of sample, light coffee brown; fumes rising from the surface of the pile.

Nineteenth sample.—From hearth 1, at 5 P. M., assays 54.48 ounces; percentage of chlorination, 86.4; the charge has been moved and banked-up again on the side of the fire-bridge; it is now dropped, the appearance and smell of the

sample indicating that it is done; the charge has been in the furnace 10½ hours.

Table of Results.

No. of Sample.	Assay value per ton, in ozs.	Percentage of loss.	Percentage of chlorination.	No. of Sample.	Assay value per ton, in ozs.	Percentage of loss.	Percentage of chlorination.
1	61.02	...	...	11	59.64	2.3	31.6
2	60.36	1.0	...	12	58.02	5.0	30.1
3	58.80	3.6	...	13	58.08	5.0	32.2
4	60.30	1.0	...	14	58.20	4.6	47.
5	64.20	5.0 gain.	...	15	57.90	5.1	65.4
6	64.20	5.0 gain.	...	16	57.90	5.1	63.4
7	64.08	5.0 gain.	...	17	54.48	10.8	81.9
8	64.56	5.8 gain.	...	18	53.88	11.7	85.
9	58.56	3.6	...		54.48	10.8	86.6
10	60.00	1.0	...				

Determining the Loss.

In making the assays to determine the silver loss, one-third assay ton of the well-mixed samples was weighed out, and from the weight of the silver button in each case was determined the silver loss per full ton; assuming, for the sake of quicker work, that a ton of raw ore, plus salt, in passing through the different hearths would not suffer any loss in weight. That this assumption is not correct is evident, and therefore a correction should be applied to get at the right results. To find out what this correction will be, we ought to know the loss in weight on every particular hearth per ton of ore, plus the salt or without it, as the case may be. This loss having only been determined for finished ore from the first hearth and amounting to about 15 per cent, a determination of it for all the other hearths not being necessary nor practicable, we apply this correction to the last result in the table, obtaining a total silver loss in roasting of 24 per cent; or, in other words: One ton of raw ore, which assays 61.02 ounces per ton, weighs only about 1700 pounds after roasting, which quantity contains only 46.31 ounces of pure silver. If no silver had been lost in roasting, these 1700 pounds should also contain 61.02 ounces of pure silver. Of the 46.31 ounces of pure silver, 86.4 per cent are in the form of chlorides and other soluble compounds; the other 13.6 per cent are not soluble in hypo, and remain in the tailings in the subsequent process of bleaching. One cause of this loss has already been pointed out. From the study of the table it may be surmised that better results could be obtained by leaving the ore longer on the third hearth, where the salt is added, and shortening the time on the second and first.

The assay value per ton of the samples 5, 6, 7 and 8 is higher than the same value per ton of raw ore, as appears from the table. This apparent anomaly disappears when we consider that quite an amount of the most volatile compounds has already escaped in this stage of the roasting, whereas no silver or only very little has yet been volatilized.

If it were possible to intercept the fumes of each hearth separately before passing through the flues of the furnace, for the purpose of condensing such quantities as may be needed for analysis and assay, valuable results might be obtained from such a line of investigation. Would a vessel made of boiler iron and of suitable size, filled with water and having an outlet for steam, attached to a long handle, be of service? To be sure that only the fumes of the hearth in question and none of those from the hearths nearer to the fireplace are caught on this condenser, this is a very simple problem.

The percentage of lumps, large and small, formed in roasting, is quite considerable, and another loss in silver is caused thereby, as they are not separated from the well-roasted ore but transferred with it to the leaching.

PREMIUMS FOR PROSPECTORS.—The Carson Index says: A movement is on foot to induce the coming law-makers to offer a premium for the discovery of mineral-bearing lodes in any part of the State of Nevada, the amount to be contingent on the known value of the ore. It must seem to every one a good proposition, and nothing could add more to the benefit of the State, for whenever prominent mines are discovered railroads will extend thereto, and the taxable property of the State be enhanced in value. The above is good and should meet the hearty approval of every one. Toiling day by day, year in and year out, the prospector gets but few thanks for what he has done, or is trying to do—his reward consisting most of the kicks and cuffs, figuratively speaking, of the community at large, and most warmly and liberally bestowed. On being refused grub, he has been known to betake himself to wood rats straight—there being nothing else to eat—thereby adapting himself to circumstances of the most reduced. There is one thing, however, in regard to the prospector of which we will speak in brief. It must be enumerated among his other weaknesses to be the greatest. It is his good nature. If he makes a successful find, and stays in the country long enough, he is bound to go through, his good nature and generous turn of mind rendering him an easy prey of the bloodsucker, who bleeds him out of everything and leaves him in the cold, dependent on the tender charities of the public. The premium is good—and why not pension the prospector, also?—*Pioche Record.*

At the Benicia pottery they have just finished an order for 10,000 stove-linings. New buildings will be erected at these works in this spring.

Increase of Manufacturing Industries.

The increase of manufacturing industries in this country is something really wonderful. Those persons who do not study closely the statistics of manufactures as they are annually presented are not aware that America, as a manufacturing country, is outstripping the world. A contemporary, on this point, aptly says: "Already, six years ago, in 1880, we had surpassed in manufacture by \$650,000,000 Great Britain, hitherto the imperial mistress among nations. So soon did Mr. Gladstone's keen forecast come true that we should ultimately become the head servant in the world's great household. From 1870 to 1880 the manufactures of France increased \$230,000,000, of Germany \$430,000,000, of Great Britain \$580,000,000, while those of the United States increased \$1,030,000,000." That increase is greater than both England and Germany combined, and at this time is no doubt fully equal to all the three leading nations of the world named.

It has been very correctly remarked that "It is more than probable, when the industrial record for 1886 is made up, that the year now drawing to a close will show a greater increase in the mechanical industries of the country than any previous year. Many enterprises have been entered into requiring a very large outlay of capital, and new plants have sprung into existence on a scale much larger than ever before. Indeed, it may be said with certainty that what with the establishment of new industries and the enlargement of the old, there has already been more capital invested in industrial enterprises in this first eight months of the current year than in any previous 12 months in our history." And there are still many others in prospect that will soon be developed in all parts of the country.

The labor troubles and higher rates of wages in this State have been a great drawback to the increase of manufacturing industries in California; but notwithstanding these hindrances, there are constant additions being made to our manufacturing facilities, both by the increase of the old and by the organization of new companies and incorporations.

It might be pertinent to inquire what has induced this large investment of capital here and elsewhere. In answer it might be remarked that the present actual and the future evident return of general prosperity has given manufacturers a feeling of confidence and security which has been lacking for a few years back. Business men, in general, have not been idle spectators of the new impetus recently manifested in the great iron and railroad interests of the country. They know that these large interests have the best means of learning beforehand of a coming industrial boom. The demands for machinery come first—that means an increase in production. Then follows the demand for rails to give additional facilities for the increased demand for transportation. The developments of the past year have shown a capacity for consumption throughout the country which makes assurance doubly sure that our overproduction surplus is well-nigh exhausted, and must be replaced with new goods and wares. This is a class of information which is within easy reach of the thoughtful and observant producer, and he governs himself accordingly.

There is another factor which has had perhaps the most important bearing upon this new departure in business. Business men have observed the hesitation of the last Congress to enter upon a general crusade against any sweeping tariff reform—and that, too, in the face of a very strong free-trade influence in that body. And now we have no hesitation in saying that the stand evidently being taken by the present new Congress will greatly strengthen the position of the active and advances business men of the country. If the efforts of the free-traders had been successful in the last Congress, and their action had been confirmed by the people at the late election, there would have been a hesitation and halt in business which could not have been overcome during the existence of the present Congress at least. Happily the danger is passed and the people breathe free.

Let us have another decade of "American policy" in contradistinction from English policy, and the nation will witness a development of industry that will even eclipse the past two decades, and more than fulfill Gladstone's famous prophecy that we should become "the head servant of the world's great household."

With a proper policy at Washington there is no reason why our industries might not be vastly enlarged, especially in the line of silk, woolen, cotton, linen, jute and ramie, and full employment given to any willing hand that really desires work. This new development will include the entire country, north, south, east and west, and will render the United States of America not only the granary and the workshop of the world, but bye-and-hye the mine, the vineyard, and the orchard as well.

A fine granite quarry half a mile south of Casa Blanca—Riverside—on the California Southern Railroad, has been discovered on lands owned by Mr. S. C. Evans, and leased to Los Angeles parties, who will proceed to open up the same at once. For the present the stone will be delivered at Casa Blanca for shipment, and as the work progresses a side track will probably be put in.

South African Gold.

Fortune-Seekers Pouring Into the Country.

The development of the gold-fields continues to absorb public attention. From every town and village in South Africa, during the past three weeks, a stream of fortune-seekers have wended their way to the De Kaap and Witwatersrand. The population of Johannesburg has more than doubled and is daily increasing; stands for building and business sites are being eagerly purchased there; new syndicates are being formed and new companies floated. The total capital of all the gold-mining companies is stated to be not far short of £2,000,000, while their value, as represented by the ruling share prices, is nearly double that amount. In many cases the realization of returns is a long way off, as there is no machinery immediately available for the development of the properties; in other instances some of the companies have been—even with very inadequate appliances—very successful; and it is this, together with the handsome return from "company promoting," which has been the incentive to so much speculation.

The Sheba Reef Company has presented a report to their shareholders, giving the result of their first six months' workings. It shows that they have crushed 771 tons, yielding 5642 ounces 16 pennyweights 6 grains—an average of 7 ounces 6 pennyweights 9 grains to the ton. The expenses incurred in this transport and treatment of this tonnage (exclusive of mining, which are nominal, the auriferous rock being simply quarried) were as follows: Transport from mine to batteries, £1689 5s; crushing, £1486; total, £3175 5s—a total of 82s 4½d per ton. Taking the value of gold here at 72s per ounce, we have a gross return of £20,031 19s 9d; deduct expenses, £3175 5s, leaving a balance of £16,856 14s 9d. Out of this the shareholders have received in dividends 62½ per cent on the paid-up capital of £15,000. With a view to avoiding the heavy charges for transport and crushing, the Sheba, in conjunction with the Oriental and Nil Dispensary Companies, has arranged for the construction of a tramway from their properties to the crushing mills site, where they intend erecting at least 30 stamps, to be driven by a turbine, to work up to 190 stamps, and when this is completed the exceptional richness of the Sheba Reef will be fully established.

Weekly shipments of native gold from the fields may now be looked for, the Donald Currie steamer of this week taking 4500 ounces of the declared value of £17,150. For this present year the total export will be about £150,000; but next year, when several of the companies will fairly start work, it is estimated that it will advance to at least three-quarters of a million.

On the Witwatersrand fields, between Pretoria and Heidelberg, some of the capitalists of Kimberly have secured gold properties from which wonderful results are also expected. Mr. W. Knight, who has been long and favorably known in connection with successful mining enterprises at the diamond fields, has secured mining rights on the farm of Driefontein, where prospecting work has resulted in the discovery of four conglomerate gold-bearing reefs, giving together an average thickness of about 23 feet, extending over three and a half miles in length, with a proved depth of about 100 feet. Adjacent to this Messrs. Rhodes, Rudd and Caldecott have purchased for £10,000 the properties of Rietfontein and Witkopjes, and several other syndicates and individuals have secured mining privileges in the same neighborhood. When companies are organized and mills set to work it is expected that these fields will give an average return of an ounce per ton, and that the total cost of extracting the gold, mining royalties and other charges will not be more than 15s per ton.

It is pretty well ascertained that the auriferous formation in the Transvaal runs across the country, almost along the parallel of 26° south from the Lehomho mountains on the east to the boundary of British Bechuanaland on the west. The latest reef discovery has been on the Malmani river, near to Zeerust, and only 14 miles from Mafeking.

At the Knysna, within the Cape Colony, it has now been established that gold-bearing quartz veins exist, although the few tests hitherto made have not given great results. From some of the surface quartz only seven pennyweights have been extracted, but selected specimens have yielded equal to four ounces per ton. The government is at the present time having a ton of the quartz crushed and assayed before determining whether the district of the Knysna will be proclaimed as a gold field or not. With the advantage of plentiful wood and water, and near proximity to an excellent port, the Knysna gold-field may prove payable with a much smaller average result than attracts attention at De Kaap and Witwatersrand. —Cape Town Cor. London Times.

A GREAT deal of scrap iron is used at the Pacific Rolling Mills. Quite an active trade is carried on in this scrap, which is gathered up all over the State and sold to the rolling mills. But the State cannot supply the demand. The Pacific Rolling Mill Company informed a reporter that it could not rely on over 300 or 400 tons a month from the State; it imports scrap from South America, from Europe, and even from British India. Laid down here, scrap iron is worth 3½ cents a pound, say \$15 a ton.

Captain Sutter's Nuggets.

General W. T. Sherman has been prominently identified with matters affecting the world's history, independent of his brilliant military career in this civil war. He drew up the first official report to the Government of the United States of the discovery of gold in California. Gold was discovered in the spring of 1848, about 60 miles above the present city of Sacramento. General Mason was at that time in command of the United States forces in California, and acted as Military Governor, with headquarters at Monterey, the capital of the Territory. General Sherman, then a young lieutenant of the Third Artillery, was the adjutant of General Mason's staff. Yerba Buena, now the great city of San Francisco, was but a hide-trading port of 400 native inhabitants. As soon as gold was discovered, Captain Sutter went down to Monterey with a quantity of samples of the precious metal for the inspection of the military authorities.

General Sherman, in conversation with some friends a few evenings since, referred to this important historical event substantially as follows:

"Captain Sutter brought into General Mason's office several small packages of samples and spread them out before us. The specimens presented varied in size from fish scales and split peas up to the size of beans. General Mason asked if I knew how to test whether this stuff was gold or not. I said certainly, and immediately tried my teeth on a lump and made an indentation, which impressed me that it was malleable. I then sent for a hammer and an anvil and pounded several pieces out flat. This was a crude but practical test; but we then applied acids, which verified the fact that the samples were genuine gold. I was at once sent up to the diggings and made a thorough examination of the gold discoveries which were rapidly being found in new localities and in wonderful amounts. I returned to Monterey with a quantity of specimen samples and drew up the official report to the Government, which was signed by General Mason. This report, accompanied with a quantity of samples of gold, was forwarded by a special bearer of dispatches, who was no other than Henry D. Cooke, recently the first Governor of this District of Columbia. He was sent off in a small sailing vessel with instructions to intercept a British steamer on the southern coast and make rapid transit to Washington, regardless of expense. We had not then been advised of the ratification of the treaty with Mexico ceding California to the United States, and were necessarily very anxious that the Government should possess information of the discovery of gold at this earliest moment."

Thus, less than 40 years ago, "Old Tecumseh's" teeth made the first official impress, put the first Government stamp of value on the gold delved from the mines of this modern land of Ophir. And it is a fair presumption that more than half of the 60,000,000 inhabitants of this republic, who are enjoying its wonderful prosperity, resulting largely from the discovery of gold in California, have been born since General Sherman indented the first gold specimen with his teeth. —Washington Critic.

PREHISTORIC REMAINS IN LASSEN COUNTY.—Mr. D. L. Moulton, of Madeline Plains, gives us the following concerning the finding of the remains of fishes, etc., while digging a well at his place. Mr. Moulton's ranch is situated on the southeast side of Madeline Plains. This fall, while sinking a well, and when at a depth of 14 feet, he struck a soft sand rock, which was taken out in layers of four to ten inches in thickness. Between these layers he found a number of skeletons of fishes, sea-shells, leaves and sticks; many of the leaves and sticks being in a petrified condition. The prints of the form of the fishes were distinctly marked between the layers of rock, and all the bones were in a good state of preservation. One fish measured two feet in length, and from the connection of the backbone he was led to believe it had been a cod-fish or haddock, but in all probability was a species now extinct. These bones were taken out and it was his intention to preserve them, but on being exposed to the air all except the back-bones were crumbled in to dust. He found many of these fishes which ranged from four inches to two feet in length. They were firmly imbedded in the sand rock with the imprint, but upon being brought to the surface and exposed to the air, it soon slacked to such an extent as to completely obliterate all traces. He says it is his intention to sink in another place and see what he can find. There is no doubt but that at some time, perhaps centuries back, the entire Madeline Plains were a sheet of water, which gradually receded, leaving the fish on dry land. —Susanville Advocate.

A BLASTING EXPERIMENT.—A rare experiment in Cornish mining has been tried this week at West Basset mine. Unhappily, however, it resulted in the manager breaking his arm. It had been decided to blast some ground in the desire to bring down, at one time, from 15,000 to 20,000 tons of stuff. Such an attempt had, perhaps, never before been made in connection with Cornish mining. The cost would be about £50 less than 1d per ton. Were manual labor used in the customary way, years would have been taken in breaking the stuff alone, at a cost of 2s 6d per ton. The instantaneous fuse of Messrs. Bickford, Smith &

Co. was used, and upon the dynamite charge exploding this stuff came away. The filling up of the vacuum caused a rush of air to pass with terrific force through the level in which the agents and men were standing. All were driven before the rush of air, and several were thrown, including Captain Nicholas, whose arm was broken. He was otherwise injured. The limb has been set, and it will be some time before the manager returns to his work. —London Mining Journal.

Handling Cages in Shafts.

We take the following from the Virginia (Nav.) Enterprise of last week:

"I notice the following item in a recent number of the San Francisco MINING AND SCIENTIFIC PRESS:

"John Hambleton, a miner, while descending on the cage at the St. Lawrence mine, Butte, Montana, was fatally injured. It appears that after dinner Hambleton gave the signal to be lowered down the shaft on the cage, and when about 100 feet from the bottom the cage began to rapidly descend, with poor Hambleton on it. He was found shortly afterward at the bottom, in an insensible condition. The brakeman, who had control of the brake at the time of the accident, says that the brake, for some unaccountable reason, would not hold. Mr. Hambleton died after being brought to the surface. The coroner's jury attached no blame to the brakeman."

"Now, what I wish to remark, and my language is plain, is simply this: There is bound to come a day when such a jury will attach blame to all companies permitting a cage to be lowered faster than a given speed."

Our communicant, says the Enterprise, is a practical miner, and knows just what he is talking about. He is also a very ingenious mechanic and inventor of a device for preventing a mining cage from falling in case of the breakage of the cable and non-working of the ordinary safeties, through the broken cable keeping up too much tension, etc.

But there is one point which he does not seem to recognize or appreciate, which is this: The ordinary regular rate of speed of cages in mining shafts—the C. and C., for instance—is 40 feet a second with rock or other material, and half that rate—20 feet a second—with men. A less rate of speed would not be advantageous or profitable, especially in deep mining. In hoisting, should the cable break, and the usual safety clutches be in good order, the descent of the cage would probably be immediately arrested. Yet it might not, and, in descending at the regulation speed of 20 feet a second, any device which would stop the cage would simply tear it to pieces, and be equal to striking bottom.

A suggestion comes in right here which costs nothing. Instead of the present style of safety clutch, which is expected to stop a falling cage within seven or eight inches, have clamps 10 feet in length—as long as the cage—so arranged as to firmly grip the guides and stop the cage in 20 or 40 feet. This would be more gradual, and perhaps more effectual. Anyhow the idea costs nothing and is merely thrown out as food for reflection.

South Australian Gold Diggings.

The Sydney Herald of November 25th gives the following summary from the gold-fields:

In mining circles there is little of particular interest to report. This excitement in connection with the Kimberly rush has long since abated, and the return of disappointed diggers is reported almost daily. What promises to be a valuable gold area has recently been discovered at Teetulpun, South Australia, where numbers of heavy nuggets have been unearthed. A rush has set in, but overcrowding the fields is very strongly deprecated. The Fairfield, near Tenterfield, continues to attract attention and about 700 persons are already on the spot; the ground having been pegged out in all directions. Up to the present time the Prospectors' claim has not yet made its first washing up, but it is reported that an inspection of this plate revealed the presence of a very large quantity of fine gold. At King's Plains, Carcoo, several nuggets have been found averaging from one ounce downward. About 50 men are on the ground.

Christie Palmerston, who has arrived at Geraldton, reports having, in company with G. E. Clarke and W. Joss, discovered a gold field 35 miles west of Geraldton and 40 miles from Perth. The prospects average 15 pennyweights to 1 ounce of fine gold to the load of wash, accompanied with a little fine tin. The wash dirt is from 1 foot to 20 inches, and the sinking 3 to 5 feet. The lead has been traced for miles, but its continuity is broken by creeks. Palmerston brought in from 30 to 40 ounces of gold. The road is very bad, being all jungle. There is no mode of transit for diggers' requirements, and the rainy season is about setting in.

A letter to the Sydney Herald from the Kimberly fields of Sept. 22d, says: "Another murderous outrage has been perpetrated by the blacks. A few nights ago, while five men were asleep in their tent, which was pitched near the Panton river, some 60 miles north of McPhee's creek, the blacks threw a shower of spears at them. One of them was speared in the side and another in the neck. The latter died almost immediately and without a groan, but the injuries of the other man are not of a serious character. The blankets protected the remainder of the party, and they escaped without a scratch. By the time the three who were not injured became awake there was not the slightest sign of a black in the neighborhood."

Santa Clara County Oil Wells.

The attempt of the Standard Oil Company to control the sale and production of oil throughout the world, has been followed by the shutting down of many mills in California, because the owners of which felt unable to enter a competition that would reduce the price of oil to less than the cost of refining. The oil company in Santa Clara county has been compelled to submit to the dictation of the Standard monopoly, but a rebellion has lately been inaugurated which appears likely to succeed. Referring to the promising oil territory in this county and the opportunities for development, etc., "J. D. M.," in a late number of the Los Gatos Mail, says: Oil is found in nearly all formations newer than the plutonic or eruptive rocks, the necessary conditions for its production being a fossiliferous stratum overlaid by a tight covering, reaching to a depth of 10,000 to 20,000 feet, where the interior heat of the earth is sufficient to effect destructive distillation, a process that is carried on in every

Manufacture of Illuminating Gas.

The tight covering is the essential part of the arrangement, as otherwise, though an abundance of oil and gas might be distilled at great depths in the earth, they would be diffused through the overlying loose earth and pass off imperceptibly. As all the products of such distillation, or at least such as reach the surface of the earth, are lighter than water, it is evident that they would follow the under side of such a covering to the surface. Hence the necessity of boring deep holes until the well known fine sandstone is tapped, when oil is sure to appear. The oil formation or fossiliferous deposit, in a former geological age extended from San Diego to Puget sound, and from the ocean on the west to the Sierra Nevada mountains, and was an ocean deposit, probably 10,000 or 12,000 feet thick. The folding of the strata, a process that can be imitated on a small scale by crowding the leaves of a book edgewise, thrust the coast ranges of mountains upward through this mass, the oil strata gradually being stripped off; first by the waves of the ocean and then by the annual rains, the wash going to fill up the lower places such as the Santa Clara, Gilroy, Sacramento and San Joaquin valleys. Generally, a lower series of rocks were gradually lifted up such as now form the summits or crests of nearly all the Coast Range, the exceptions being the mountains now covered with the redwoods, the soft shaly rock, with the moist climate, being especially adapted to a tree forest. The oil formation

Disappeared Long Ago

From the mountains that contain quartz, limestones, paving stone, serpentine, etc., these last being known as metamorphic or changed rocks, from the fact that the fossils have disappeared, the material thereof being now crystallized limestone. The oil formation, sometimes of great thickness, is seen dipping under the valleys on all sides of the Coast Range. Some traces of it may be found lapping on the lower flanks of the Sierras, but as they are much older than the Coast Range the oil formation is often obscured by the wash from the older mountains. It is the deposits along the coast ranges that interest us as the likely fields for exploration. The oil measure generally is a clayey shale of a dirty white color, verging on a bluish cast, and sometimes quite dark, or nearly black. Whenever it assumes a hard, flinty character the chances of finding oil are considerably increased, for the reason stated at the beginning of this article, as without it the oil, if any, would pass off. Careful search will almost always show oil or gas coming out of the upturned edges of these strata. The presence of the smallest quantity, either as a fluid or gas, is conclusive, and is a good basis for farther search. Such indications are found in this county all the way from Sargent's Station, on the Pajaro river, to Mayfield. Small quantities of oil or gas are perceptible in numerous places around Los Gatos. The water of nearly every well sunk on the junction of the two formations (oil measure and metamorphic rocks) is affected more or less by it.

The Proper Place for Boring

Is not on the upturned edge of the formation, but perhaps miles away where there is no sign of oil except in the character of the rock. A practical geologist to make a careful examination is necessary. A hole bored on the edge of the formation would sink into the barren metamorphic rocks. Such a hole was sunk by the citizens of Gilroy, 2000 feet deep, at an expense of \$15,000. Ill-advised search is sure to result in a failure, causing a bad reputation for really valuable oil territory. There are promising points near Gilroy, San Jose, Mayfield and San Lorenzo, and all along the San Joaquin valley on the eastern slope of the Coast Range, especially on the line of the railroad through the Livermore valley. Well-directed search is sure to result in final success, though many failures will of course occur, as in all underground explorations. The accidental discovery of gas near Stockton is likely to produce a thorough test of that part of the country. A similar discovery here would have the same result. But why should the people of San Jose wait for the accident, when a little well-directed search would determine the matter, and place them in the lead in the oil industry? The cost of a few trials, divided among the citizens at large, would be but a trifle.



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SAN FRANCISCO:

Saturday Morning, Jan. 8, 1887

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Passing Events.

California still continues the leading gold-producer of the United States, the yield last year having been \$12,579,350, while the next State in order of production is Colorado, with \$3,500,000. California total production of gold and silver was \$14,690,335. We shall give these and other figures further consideration in our annual review on the 22d inst.

The weather continues fine in these latitudes, the days being warm and skies clear. Some uneasiness is being felt on the subject of a "dry year," but this is not as disastrous to the State as formerly, when more dependence was placed on wheat-growing.

Work will soon be commenced on the new Government cruiser by the Union Iron Works, which is quite an event in the mechanical history of the Pacific Coast.

The new gold placers in New Mexico are attracting considerable attention, and a number of miners from neighboring regions are going to the new camp. We shall soon learn the truth of the rumors concerning it.

THE Klamath river is now being located for mining, all the way from the mouth of Humboldt creek to Cottonwood, which will cause a great increase next season in the business of river mining. Only two or three claims have been worked in this section of that rich-paying stream.

Mining Mistakes Common in the Past.

As gold mining, after having fallen to a comparatively low estate, is once more coming to the front in California, some remarks on the mistakes that have heretofore tended to retard the progress of the business, and even bring it into disrepute, might at this time serve a good purpose. First in this category is the disposition so generally shown by mine-owners, experts and others interested in promoting the sale of mines to overestimate the value of such properties. Every mine is, of course, worth whatever it will bring on a fair statement of all the known facts in regard to it. But when these facts are concealed, distorted or misrepresented, as has been too often the case, the friends of fair and honorable dealing have a right to complain of such practice, and even protest against it, as being not only detrimental to the mining interest but in violation of those principles of common honesty which in every other branch of business are expected to govern.

If a merchant sell a cargo of wheat and even a few sacks fail to come up to the sample by which the sale is effected, he may be made to answer in damages. If the vender of a horse or cow misrepresents the good or conceals the bad qualities of the animal, the buyer may obtain redress in a suit at law, and it is difficult to see why a different rule should obtain in mining matters. There is, in fact, no reason why this should be so, nor is it to be expected that investors in mines will continue to tamely submit, as in times past, to the impositions practiced upon them.

Another crying evil in connection with mining transactions is the exorbitant commissions that promoters and middlemen have seen fit to exact for their services, and which have generally ranged from 40 to 60 per cent of the price mine-owners have realized for their properties, this tax coming oftener, however, out of the purchaser than the vender. Here, again, the reason for submitting to these extravagant charges in mining more than other affairs is not clearly apparent.

Another mistake often committed in the formation of mining companies is the over-capitalization of their properties, a practice greatly to be deprecated as being neither honest nor expedient. Such inflation of values is lacking in honesty because it tends to mislead the more inexperienced and ignorant portion of the investing public, and impolitic because the better informed of this class will not be likely to buy the shares of a company whose property has been so over-capitalized that there is little likelihood of their ever being able to pay any considerable dividend on their stock. A mining company starting out with a nominal capital so out of all proportion to the value of their property is apt to create the impression that it has been gotten up for the purpose of selling shares rather than making a large and profitable production of bullion. Such course is calculated to excite distrust rather than create confidence in the scheme, and where pursued may even bring a fairly good property into discredit.

The owners of some of the most valuable mines in the country have shown a commendable modesty in this respect. The Calumet and Hecla Company, which has disbursed nearly \$23,000,000 of net earnings to its shareholders, has a capital of but \$2,500,000, divided into 100,000 shares, of the par value of \$25 each, but now selling at the rate of \$229 per share. The Richmond Consolidated Silver Mining Company of Nevada, incorporated with 54,000 shares, of the par value of \$25 each, making a capital stock of \$1,350,000, has to date disbursed in dividends nearly four and a half million dollars. The capital stock of the Idaho Gold Mining Company at Grass Valley, California, consists of 3100 shares, of the par value of \$100 each. This mine has netted the owners over \$4,000,000. The Sierra Buttes, Plymouth Consolidated and numerous other California gold mines might be cited as additional examples of large merit, coupled with comparatively small amounts of capital stock. The Bonanza companies on the Comstock lode, who, when their mines were making a large production, greatly increased the number and value of their shares, have, with their late shrinkage of production, found it expedient to restore their capital stock to its original status, which will probably not again be disturbed, even though the mines themselves become as

prosperous as they were when the above change was made. As the business of mining has come to largely conform to the more rigid rules that govern in commercial transactions, so should those having its conduct in charge be careful to avoid everything having the semblance of extravagance or speculation. Hence the propriety of mining companies reasonably restricting the number and nominal value of the shares constituting their capital stock.

Some remarks on the mistakes most common in the development, equipment and the practical management of mining properties, are reserved for another writing on this branch of the subject.

Blankets for Saving Gold.

The blanket system may be said to have been introduced into the mills at Grass Valley in 1853. The head blanket troughs were then made in lengths of about six feet, and the fall from one trough to another was from a height of about six inches. The inclination was at an angle of from three to five degrees with the horizon, and they were movable and so arranged that, by pressing on a small lever, the amalgamator would vary the inclination to suit the flow of water and pulp from the batteries.

The blankets first used were the common had ones with a long nap. They were expensive, as the nap came off very easily, and there was a great waste in cutting them to fit the troughs. When the Woolen mills were established in San Francisco, blankets were ordered in long lengths and the width of the trough. They were made of a very coarse wool with the nap thrown up on one side, and altogether a better article than is now furnished to the different mills. So says Mr. Melville Attwood, who first used these blankets at Grass Valley.

Neither the French mill nor Gold Hill mill amalgamated in the battery, nor used copper plates. The pulp passed into a small trough in front of the battery sieves and then passed over the blankets. Every 20 or 30 minutes the blankets were changed and rinsed out, that their surfaces might remain rough and hairy and not become clogged by the fine quartz, and so fail to afford a lodgment for the particles of metal.

Wherever the blankets were changed, the pulp in the troughs in front of the battery was removed and thrown with that washed from the blankets. The washings from the blankets were then ground and washed in troughs and howls to take out all the gold.

At Wiggams' mill, Nevada City, they amalgamated in the batteries in the early days of milling there, say 1855 and 1856. In the Empire mill, Grass Valley, they had pans of mercury in front of the battery sieves, and the pulp passed over the mercury before going to the blankets. In the French mill, the pulp first settled in a box in front of the battery and then passed over blankets. At the Mt. Hope mill, the blanketed trough was divided into two lengths, and between them a pan of mercury was placed, so that a portion of the gold was caught there and was in contact with mercury before passing over second blankets. The rule generally was, however, not to permit mercury to touch the gold before it passed the blankets. This was because, in coating the particles of gold, the mercury renders them globular, destroying their natural angles, thus rendering them less likely to be caught. In some mills the quartz was received from the blankets by a Stetson amalgamator, which is a chest of shallow drawers, each of which is perforated with half-inch holes, arranged so that those in one drawer are over the centers between the holes in the one below. Around these holes are small grooves, which are filled with mercury to catch the gold—the tailings passing off through the holes.

They did very good milling in the early days at Grass Valley when the blanket system was the main dependence, as the figures given in another column, under the head of "Average Yield of Gold Quartz," prove. At some mills the blanket washings were run over the blankets a second time.

THE Locomotive mine, of Arizona, was called for the first time on the stock board on Tuesday, and had quite a lively call. Nearly 5000 shares were sold from \$1.25 up to \$1.50.

Rainfall and Mining.

A Limited Rainfall no Great Hindrance to California Mining.

The rainfall in California for the present wet season has thus far been somewhat less than usual. The precipitation in December came up to about the average for that month. During the preceding autumn it was, however, considerably less than the average. January, to date, has brought us scarcely any rain, present indications still pointing to continued dry weather. While there is yet time enough for sufficient rain to answer every purpose, it cannot be denied that the farmers in some parts of the State have cause for uneasiness.

With most of our miners, however, it is different. A dry winter has no terrors for them. A water famine cannot, in fact, occur in the gold fields of this State. However slight the precipitation in the great interior valleys and further coastwise may be, it is always abundant on the Sierra Nevada and the other ranges of mountains lying adjacent to the principal mining districts. The snow falls on these mountains to a great depth every winter, and melting in the spring and early summer months, keeps the larger streams, all of which have their sources in these mountains, well replenished until the dry season is far advanced, and, in some instances, till the advent of the fall rains. Such of these streams as head in the main Sierra traverse the principal gold belt of the State at various angles, the most of them running diagonally across it. The minor gold field that occupies the northwestern angle of the State is watered by the Trinity, Smith, Scott, Salmon and the Klamath rivers and their branches. These rivers, with the exception of the Klamath, have their sources in the Coast Range and connecting groups of mountains, the Klamath heading far to the northeast in the great lakes lying on either side of the California and Oregon lines.

The heavy snowfall on these mountains is due to their great altitude, which varies from 5000 to 10,000 feet. But while the mountains are themselves so lofty, the gold fields lying along and adjacent to them are for the most part much lower, their mean altitude being less than 3000 feet. They have, therefore, a mild winter climate—so mild that mining of all kinds can be carried on to advantage the year round. During the dry season the water supply is kept up through the melting of the snow on the mountains above, the temperature never being so low in these foothill regions as to seriously interfere with mining operations, even in the winter.

As there can happen in these, our California gold fields, nothing like a dearth of water, so can there occur here no destructive floods. The rivers flowing in deep gorges have little chance to escape from their channels; nor, should they do so, can much harm ensue, there being along them no farming land or other property exposed to be injured by their overflow. If, during any winter, the precipitation is excessive, the water being stored in the mountain reservoirs insures throughout the next dry season an ample supply for all; if deficient, the roads are apt to be good, favoring ore transportation to the mills, such a low stage of water being at the same time produced early in the summer, as gives the river-hed miner a long working season, thereby insuring from this source such an increased product of gold as goes far toward making up for any deficiency that the drouth may have caused in hydraulic and quartz mining, from all which it will be seen that if at any time we chance to have in our mines too much or too little rain, compensating advantages arise out of either condition, as it may happen to obtain.

Turning now from California and directing our attention for a moment to the countries lying to the north and east of us, and how different the condition of things in the mining regions there. Having a common elevation ranging from 5000 to 6000 feet, even the lowest portions of these countries are now covered with a thick coat of snow. The streams are ice-bound and the ground everywhere frozen to a depth of several inches. The temperature is arctic, the thermometer rarely ever rising above zero, and falling sometimes to 40° below that point. Blizzards tear through the mountain canyons and sweep over the desolate plains with irresistible fury. Railroad trains are snowed under. Teamsters, stage-drivers and travelers freeze to death,

Cattle by the thousands perish from cold and hunger. Only underground mining can be carried on, nor is this always practicable, much of the time it being impossible to get the ore from the mines to the reduction works. Placer mining, in the few localities where this branch of the business is still practiced, has to be suspended from October till April, or later, both the ground and the water being in the interim frozen up. Such is the condition of things that at this moment prevails throughout most of the mining districts in Nevada, Utah, Idaho, Montana and Colorado.

Little wonder the experts and other mine-viewers leave our less favored neighbors and seek in California a more enjoyable as well as otherwise favorable field for the prosecution of their winter labors. Indeed, we do not see how this sort of work can be effectively carried on under circumstances so distressful and discouraging. These gentlemen are quite right in pursuing a course at once so business-like and so conducive to their physical comfort.

The more we revolve in our mind the advantages California seems to offer for the prosecution of gold mining, the more do they grow in our estimation. At each writing these advantages assume larger and larger proportions, accordingly as we have time to more fully consider the subject. That our gold-bearing territory offers the best field extant for the investment of money in mining, we entertain no doubt.

Pacific Rivers and Harbors.

It is exceedingly difficult to get appropriations for rivers and harbors that really need improvement, and comparatively easy to get them for those that do not. The reason for this is that members of Congress will not vote money for places in which they are not interested unless others will vote it for their localities in return. In consequence, much money is spent uselessly, and those places which really need work upon them suffer. The appropriations are always cut down, and the sums spent so little at a time that the work is costly and unsatisfactory. As an example we may cite Oakland harbor, which is to cost about \$2,300,000. They have been at work for 12 years and are not half done, when the whole harbor would have been finished in five years at greatly reduced cost had money been forthcoming promptly. They asked for this harbor this year \$250,000 and get about \$60,000.

The engineers in charge get very much disgusted at the way their work has to drag along on all such improvements. The estimates of the engineers are always cut down largely by the committees. The House Committee this year recommend a grand total of appropriations of \$7,158,250, while the total of estimates submitted was \$30,201,749. Among the appropriations are the following: California: Harbors—Humboldt harbor and bay, \$50,000; Wilmington, \$50,000. Rivers—Sacramento and Feather, \$10,000; San Joaquin river and Stockton and Mormon sloughs, \$10,000. Oregon: Harbors—Coos bay entrance, \$25,000; Yaquina bay, \$50,000. Rivers—Canal at the Cascades, \$100,000; mouth of Columbia river, \$125,000; Lower Willamette and Columbia rivers, \$125,000; Upper Willamette (to complete), \$35,000; Coquille river, at its mouth, \$12,500. Washington Territory: Rivers—Skagit, Stielagnamish, Nootsack, Mohamish and Snowqualmie rivers, \$10,000.

The receipts of coal at this port in 1886 were over 1,000,000 tons, the largest in the history of the State. Despite these heavy arrivals, however, the market has been firm for some time and prices have been slowly but steadily creeping up. If continued dry weather indicates a diminished wheat yield, then fewer ships will be sent here to transport our grain abroad. As most of these ships bring our foreign coal, it will readily be seen that decreased supplies from this quarter will harden the market materially, and be of great benefit to the coast collieries, though of course, the consumer would have to pay more for his coal. It is on this weather condition that the coal men are now figuring, though a good rainfall would alter the situation materially.

SIXTY-ONE inmates of the Stockton Insane Asylum, who belong in Arizona, will be transferred January 10th to the new asylum built by the Territory near Phoenix.

Silver-Plated Amalgamating Plates.

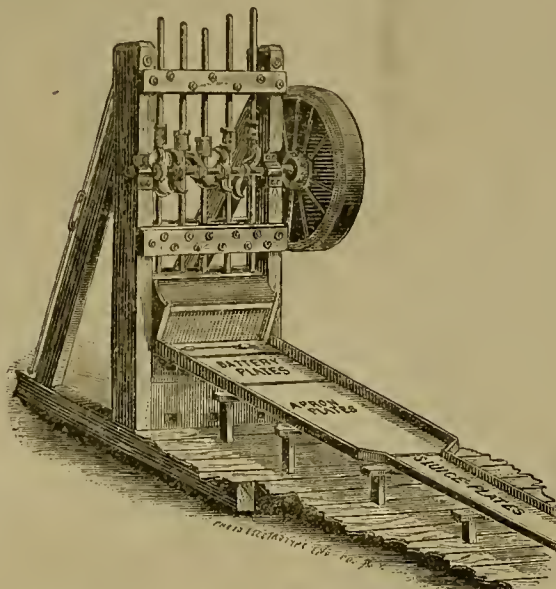
Of late years the silver-plated amalgamating plates have largely superseded the old style of copper plates for saving gold in quartz mines. They possess many advantages over plain copper, the principal one of which is that the amalgam clings to them better and the amount of gold saved is increased. No verdigris forms, so that there is a saving in labor also. They are cleaned by means of an ordinary rubber scraper. They retain a larger quantity of quicksilver on the surface than was possible with the plain copper.

In conversation with Mr. E. G. Denniston, of

order—plain, corrugated or rifled, and of any size, shape, or thickness of copper. The silver is put on by weight, the amount being determined by the price. The largest plates of this kind ever made have been turned out by the San Francisco Plating Works, which is outfitted very completely for this class of work, which is made a specialty. At the last 15 Mechanics' Institute Fairs the first premium medal for these plates has been awarded Mr. Denniston.

Saving Fine and Flour Gold.

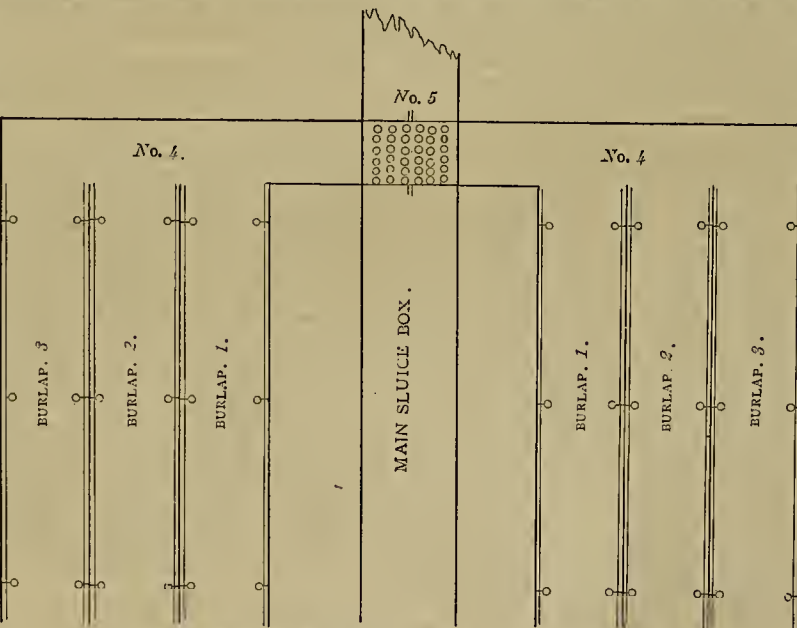
There is always more or less discussion on the subject of saving fine and flour gold and



ARRANGEMENT OF PLATES IN GOLD QUARTZ MILLS.

the San Francisco Plating Works, who has been making these plates for the past 18 years, and has filled upward of 3000 orders, we gained some facts concerning them that will be of interest. The copper used runs from No. 16 gauge up to one-fourth inch. No. 16 weighs about three pounds to the square foot. The 3-16 weighs nine pounds to the square foot.

the gold from black sands of the ocean beach. Mr. C. Beckmyer, of Blossburg, Montana, sends us a drawing and description of an apparatus which he states will save all the fine and flour gold that passes through, at a very small expense. A drawing of this machine is shown on this page, the view being a plan—looking down upon it. Mr. Beckmyer says: "All that is



SLUICE FOR SAVING FINE AND FLOUR GOLD.

The battery and apron plates are generally silvered heavier than the sluice-plates. The position of these respective plates is shown in the accompanying cut, which represents a mill provided with such plates.

The plating runs from half an ounce of silver up to three ounces per square foot of copper. Prices vary from \$1.50 up to \$6 a square foot, exclusive of cost of copper. For an ordinary 10-stamp mill an outfit of these plates would cost from \$250 to \$300, according to character of plating and weight of copper. Mr. Denniston states that he is sending these plates to all the mining States and Territories, as well as to Mexico, Central America, South America, etc., and people who first bought them years ago still renew their orders, which speaks well for their utility and excellence. The plates are made to

needed is a string of sluice-hoxes. Take the next to the last sluice-hox and cut a hole in the bottom 18 inches square, according to width of box, etc. Place a perforated sheet of iron in same, but to be on a level with bottom of sluice-hoxes. Underneath this sheet-iron a dividing board is placed. Then, leading from under this sheet-iron, is a box running out on each side (No. 4), and from this box No. 4 are three side boxes or grizzlies in which the hurlap is placed (Nos. 1, 2 and 3). These side boxes are placed at water level. The dirt is ground-sluiced, or it can be hydraulicked into the main sluice-hoxes. The coarse matter goes over the perforated iron out through the sluices, while the fine matter goes through the perforated iron into the side-hoxes or grizzlies over the hurlap (Nos. 1, 2 and 3). The side hoxes being only at

a gradual or water-level grade, the fine gold is caught by the burlaps and held. When the burlaps are well covered with flour or fine gold, they are then taken out and washed in a tub of water and the burlaps replaced. After the tub is half full, quicksilver and cyanide of potassium are put into it and the contents well stirred at intervals for 24 hours. Then the material is run over plates and the amalgam taken off with hard-rubber scrapers in the usual way.

"In the sketch, Nos. 1, 2 and 3 are side hoxes or grizzlies, six feet in length and 18 inches wide. The sides of the hoxes are six inches high. In the bottom of each of these side boxes burlap is placed, and tightened on each side with a narrow strip of wood, these strips being held by buttons. No. 4 are hoxes leading from under No. 5, which is a perforated sheet of iron 18 inches square. The bottom of the sluice is out out 18 inches square, and the iron fitted into it tight. The side hoxes are placed at about water level." Mr. Beckmyer says he scarcely thinks this device patentable, but that it is the cheapest way to save flour gold, being especially adapted for ocean beach sands.

Foundry Notes.

Business at the foundries has been more encouraging of late than for some time past, most of them reporting some increase of orders. The renewed interest in mining affairs both here and in Nevada is expected to result in more orders for mining machinery, which were not very plentiful during the past year. It is pleasant to note, however, that marine work is becoming of more importance here now than ever before. The Union Iron Works are building a new steel steamer for the coast trade, and the Fulton have the contract for the machinery of the new ferry-boat of the South Pacific Coast Railroad Company.

Not only are city foundries expectant of more orders this year, but small foundry and machine shops are springing up in many of our interior towns. In Southern California of late, several small plants have been arranged. At Sacramento the railroad shops are very busy, and the force of men employed is the largest that has been there for a number of years. The prospects are that the full force that is now employed, with some increase, will have steady employment all winter, and this means good times for this community. The preliminary work for the construction of the proposed new engines will begin just as soon as the other work can be disposed of. Another immense general machine shop has been planned, but Master Mechanic Stevens states that the date for beginning its construction has not yet been determined on. It will be in the near future however. The shop will be 240 feet in depth and 90 feet in width.

The contract for the building of the Government cruiser Charleston has been signed by the Union Iron Works Company and the papers forwarded to the Secretary of the Navy. The keel of the new cruiser will be laid in a few days. The price is \$1,017,500, and the bonds furnished by the company amount to \$254,375. The iron company of Irondale, Puget Sound, have sold all the iron which they had on hand to the Union Iron Works. The building of this big cruiser will be a good thing for Puget Sound, as San Francisco will draw upon that locality for supplies of iron, coal and lumber.

The large iron dome for the Lick Observatory at Mt. Hamilton is being temporarily erected at the Union Iron Works. The dome is 50 feet high and 75 feet in diameter, weighing 122 tons. It will be completed in March, when it will be tested before being shipped to its destination. It is being put up "loose," since it will have to be taken down for shipment.

MINING IN CHILI.—Recent South American advices state that the celebrated Manta de Ossa mine, in Chanarcello, continues in bonanza and is yielding largely. The famous Veterana mine, Chili, is again in bonanza, and is putting out considerable quantities of high-class ore. It is estimated that the Esmeralda mineral district, Chili, has yielded from the date of its discovery, about three years ago, upward of \$3,000,000 worth of silver ore.

THE golden Lapanto mine, of Hawthorne district, looms up with a new and important strike which is reported to be of great value.

MECHANICAL PROGRESS.

Improvements in Steamer and Locomotive Engines.

Both double and triple expansion engines are rapidly coming into use for steamers everywhere. The double-cylinder engine has done so well that in Europe triple-expansion cylinders are just now being very generally ordered for new steamers. In regard to the popularity of this latest improvement we have seen it stated that no contract has been let to build an ordinary compound engine for the English navy since January, 1885; none for the French navy since May of that year, and none for any navy within the past year. The English have now about 30 triple-expansion engines under contract for their navy, the French 10 or 12, and the Russians and other powers quite a number—in fact, all the latest-designed vessels in Europe.

Four-Cylinder Locomotives.

There is also a revolution impending in the construction of locomotives, and that improvement is due to the success which has everywhere attended the triple-expansion engine on ocean steamers. Not," says the *New York Sun*, "that compound engines are to be used for locomotives, but if a number of cylinders aggregating the same power will save coal on an ocean steamer, why not on a locomotive? The fact that the present system is not the best has been well known for a long time. The transmission of power through the connecting rods of the two drivers is an uneconomical way at best, and when in going around curves the wheels are not able to turn in unison, one or the other must slip so long as they are rigidly connected.

"Now it is proposed to use four cylinders instead of two, one pair for each set of drivers. The aggregate power of the four is equal to that of the two now used, but it was found in a series of experiments made at Woolwich Arsenal in England by the British War Office that the power used to move the locomotive itself was from 30 to 40 per cent less with the four cylinders than with the two. The experiments were made with an old two-cylinder locomotive altered to use four cylinders. Of course, the results were not equal to those that could be obtained with a machine made to order. The coming locomotive will have a pair of cylinders for each driver-wheel axle."

Danger of Water in Steam Pipes.

Many are not aware of the danger that ensues when condensed water is permitted to accumulate in steam pipes and no means provided for drawing off, by suitable opening provided with cocks arranged or located at the lowest points in a line of pipe.

The danger arises from the fact that when the steam encounters a body of cold water, there is rapid condensation, causing a vacuum, and the violent rush with which the water is then driven along the pipe like a water hammer, against elbows or the casing of a valve, sufficient sometimes to drive a hole through the solid metal, as if it had been punched with a solid ram of steel. Connecting pipes between the boilers of a battery, a part of them having been cold for a few days, have been ruptured by opening the valves that closed the connection with the boilers under pressure of neglecting to properly drain the pipes. Men in charge of boilers have been seriously injured by neglecting these precautions. Not only valves have been ruptured, but steam pipes are sometimes split, in some cases for several feet of their length.

It has been proved beyond question that no steam fitter who neglects to provide for the easy and rapid removal of all water of condensation is fitted or competent to be trusted with the supervision of work requiring the intelligence and caution which has been shown to be necessary in laying lines of pipe for carrying steam.

There is no doubt that a reliable automatic steam trap which will drain the water off from the line will prevent these disasters; and it is the duty of persons in charge of the erection of steam lines to see that ample means are provided for preventing the accumulation of water. Every low part or place in the line should be provided with traps or drain cocks, ample to carry off in a few minutes any water in that part of the line.

It is often found that through false notions of economy the cocks placed for draining off the water are too small, and it often happens that the man who is charged with the duty is hurried, and the work is only half done. The best economy is to arrange so that a line of pipe can be quickly and easily drained, and, by this, the possibility of disaster is removed.—*Master Steam Fitter*.

SOMETHING NEW IN BELL MANUFACTURE.—A new method of making bells has been invented by an Englishman. The bell is not cast, but made of metal bent or spun to shape. It may be made in several pieces and hard-soldered together. The peculiarity of the bells so made is that they give an astonishing volume of sound. One which weighs but three and a half pounds gives, it is said, as much sound as a cast bell of ten times the weight, and the tone is very pure and true. The inventor guarantees to produce a bell weighing one ton that shall be as musical and efficient as an ordinary

bell of 20 tons. If this can be done it will be a great advantage as regards church bells, requiring much less outlay both for the bell itself and for the structure in which it is hung, to say nothing of the lessened cost of transportation.

The Age of Steel.

The present has been called "the age of iron," but it might be more appropriately termed the age of steel. The processes of manufacturing steel have been so improved and cheapened of late that this material is rapidly taking the place of iron in many industrial applications, and the substitution will probably be more extended in the future. Steel rails for railways are now produced almost as cheaply as iron ones; indeed, a great Belgian house recently offered steel and iron rails at the very same price. Steel manufactured by the Bessemer and Siemens-Martin processes may be expected ere long to be used instead of wrought iron for almost every purpose. One of the latest uses proposed for steel is in the making of tin-plate. The Bessemer method of producing steel, which had its origin in England some 25 years ago, still continues to be followed more largely in that country than any other. No industry in modern or ancient times has sprung so suddenly into importance, nor has any other caused greater changes in the way of setting aside an old and introducing a new order of things. To this change is due the fact that numerous iron furnaces have been closed up and thousands of workmen thrown out of employment and compelled to seek new fields of labor. The age of iron is fast coming to an end and the age of steel has nearly, if not quite, overshadowed it. As a consequence, our industries must recognize the new era and adapt themselves to the changed demands. The revolution may be attended with temporary inconvenience—with loss to both workmen and employers—but in the end it will prove of advantage to all. Such things are among the necessities of this age of progress and improvement.

ALLOYS.—The art of combining metals to acquire the peculiar or best qualities of each is of very ancient date, coins having been found bearing a date 335 years before Christ, which contained some tin in their composition, and from that day to this, experiments have constantly been made to acquire the finest results by amalgamating different metals. There is still room for improvement in some direction in all of the alloys thus far produced, even the delta (copper, zinc and iron), the lead-bronze (lead and antimony), German silver and sterrometal (copper, zinc and iron), phosphorized bronze, etc., having failed to give complete satisfaction in some respects. An alloy recently patented by a Frankfurt man is said to surpass all others in its exceptional durability and resistance to all acids. A cylinder made of the new Reitz alloy was left to lie for six weeks in concentrated muriatic acid, at the end of which time it had only lost 5.02 per cent, while the least amount lost by other alloys during the same test was 12.42 per cent. Other experiments with the new bronze were equally successful. The price is no higher than other alloys, but the process is patented at home and abroad.

AMERICA'S FOURTEEN INVENTIONS.—Some time since an English journal frankly gave credit to American genius for at least 14 inventions and discoveries which, it says, have been adopted all over the world. These triumphs of American genius are thus enumerated: First, the cotton gin; second, the planing machine; third, the grass mower and grain reaper; fourth, the rotary printing press; fifth, navigation by steam; sixth, hot air or caloric engine; seventh, the sewing machine; eighth, the india-rubber industry; ninth, the machine for manufacture of horseshoes; tenth, the sand blast for carving; eleventh, the gauge lathe; twelfth, the grain elevator; thirteenth, artificial ice manufacture on a large scale; fourteenth, the composing machine for printers. And yet the inventions of the magnetic telegraph, the telephone and the ironclad war ship are not included—the three which, perhaps more than any of the others mentioned, except possibly the cotton gin, have done more than any others to revolutionize the world, its industries, its commercial relations, and its methods of war.

SPINNING ATTACHMENT TO SEWING MACHINES.—The *Scientific American*, some two or three years since, had a cut and description of a spinning device to be attached to sewing machines, intended to take the place of the spinning wheel generally used with hand machines for spinning. The attachment, which is the invention of a Nova Scotian, is fastened to the legs of the machine immediately beneath the table, and is driven by a hand from the driving wheel. It also suggested that if some genius should invent a loom attachment, to do the weaving, and a cotton-field attachment, to raise the raw material, the machine will be complete. We have not heard of either of these devices being introduced into practical work as yet.

REST IN STEEL.—The physical condition of steel is known to be unsettled for many hours after being rolled. Finally it comes to a state of rest, but any test of its quality before that period arrives is misleading.

SCIENTIFIC PROGRESS.

Combustion of Powder in Cannon-Firing.

Some very interesting experiments have recently been made, by photography, showing the imperfect combustion of powder in the discharge of cannon. The experiments were made by Light Battery K, U.S. Artillery, stationed at the Presidio in this city during its last summer march to Monterey. The photographer was Lieut. H. E. Harris, army instructor in photography. Instantaneous views were taken at the moment of discharge, showing distinctly the smoke from the vent and the mouth of the cannon, while at some distance from the smoke a bundle of radiating lines are seen for the distance of about eight times the length of the gun, gradually separating as they move forward. It is held that these lines are unburnt grains of powder, and that it is this unburnt powder which causes the erosions or grooves on the inner walls of the gun, which, as they increase in number and depth, work a very material damage to the gun.

These photographs have been carefully engraved by the *Scientific American*, and accompany a letter-press account of the experiments in that paper. The guns employed were 7-inch muzzle-loaders, and the photographs appear to show that a very large proportion of the powder was thus expelled—much larger than has generally been supposed. These guns had been subjected to a discharge of only 600 rounds, and yet they were seriously injured in the manner alluded to. The heavier the gun the larger is the charge employed, and of course the greater the amount of damage sustained.

Experiments of this kind have heretofore been made by firing at screens and noticing the effect on them which must have been produced by the unburnt powder. But the photograph is much more decisive and satisfactory, and makes a most graphic exhibition of the phenomena. The idea of such a method of their study is worthy of a California observer and affords another wonderful illustration of the progress of the art of photography in this State, and of the favorable conditions of our atmosphere for such work.

A correspondent of the subsequent issue of the paper alluded to suggests that the lines shown may not be altogether due to unburnt powder, as pieces of ignited and semi-carbonized asbestos cloth or other materials employed to wrap the charge might produce a large portion of the lines shown.

Microbes a Necessity.

The editor of the *Medical Press and Circular* takes quite a utilitarian view of the presence of microbes in animal and vegetable economy. Speaking in a somewhat facetious way, he writes as follows:

A great deal of ill-feeling has been excited among these unfortunate animalcules, whose size should have insured them protection against contumely and insult. There is scarcely a disease, scarcely a mishap, but what they are inveighed against and condemned without a hearing, and very often, indeed, without being even called upon to put in an appearance. As an independent journal we feel it our duty to protest against wholesale and often unfounded denunciations by individuals not unfrequently formulated more with a view to self-aggrandizement and notoriety than from any positive ill-will toward these humble little beasts. We will not deny that a few of them have gone astray. When they engage in the elaboration of the virus of typhoid, smallpox and measles, to say nothing of hydrophobia, and a variety of other uncomfortable visitations for mankind, it is only natural that we should retaliate by calling them opprobrious names in dog Latin, and by poisoning them wholesale when and where we can bring our animosity to bear upon them. They have manifestly violated the statutes in such cases made and provided. But on the other hand, he will assert, with the courage and independence that is our wont, that if there were no microbes there would be no mankind, and our disputes would be silenced in death.

Our very digestion depends upon them to a great extent, and if they were withdrawn from circulation we should very shortly become painfully aware of the fact.

They are accused of contaminating our water, but it is equally certain that were it not for their ceaseless activity all the water in the world would be a concentrated solution of excrementitious and noxious products, the disintegration of which is due to these little organisms.

The importance of microbes to the growth of plants has been practically demonstrated by M. Laurent, who obtained only one-fourth as much huckwheat from sterilized mold as in soil containing bacteria.

As an American contemporary points out, there are about a thousand species busily engaged in the destruction of wood, and, were it not for their intervention, all the trees that ever grew would be standing to-day, living, or it may be dead, but in any case as solid, as sound and as firm as when they ceased to grow, and all life must have been choked out ages since. Fire alone would have relieved mother earth of the incubus thus weighing upon her, but only with the result of leaving every patch

of land a parched and ash-covered area, inadequate—at any rate, for some time—to the maintenance of life, even if we ourselves had not at the same time been prematurely scorched off the face of the earth.

No, let there be no class distinctions; every community has its black sheep, and these should very properly be branded with the mark of infamy. The existence, however, of these misconducted atoms will not justify our extending the anathemas to the countless millions of their species in whom and with whom we live, and move and have our being.

EXPERIMENTS IN THE COMBUSTION OF COAL.—Experiments and calculations relating to the heat of combustion of coal are continued with unabated interest, and contributions of more or less value to the existing knowledge of the subject are constantly being made. The investigations of Scheurer-Kestner, and the devices of Fischer, Schwackhofer, Thompson and others have been of great service in pointing to errors in figures and methods commonly accepted as substantially correct, and yet later experience has shown the necessity of further careful work in the same field, and the possibility of grave errors in calculations based on data now available. The objections which have been urged against several of the calorimeters proposed and used within the past few years are that they are too complicated, and that the corrections to be applied are too many and too important. Unfortunately, there is much truth in this. The work of investigators seems in many instances to have been devoted more to the development of different methods of accomplishing the same purpose, each without any special advantage over the other, than to the best possible solution of the problem and the elimination of factors and elements liable to introduce errors into the results. It is to be hoped that this fact will receive due consideration in future experiments. A judicious combination of simplicity and delicacy in the measuring instruments, or, in other words, a minimum of complexity for a maximum of efficiency, is the point to be sought, and upon it rests the attainment of practically valuable and reliable figures.—*Iron Age*.

SILOTVAAR, A NEW EXPLOSIVE.—Mr. Rucktschell, a Russian engineer, has, it is said, invented a new explosive, which he calls "silotvaar," with which experiments have been recently carried out at the camp of Krasnoie Selo, near St. Petersburg. As compared with ordinary gunpowder, the penetrative power of the new explosive, when used for cartridges, is stated to be ten times greater. The compound of which the explosive consists is still the secret of the inventor. The explosive, an exchange says, emits no smoke or heat, and the discharge is unaccompanied by any report. Since these experiments the Russian war and naval authorities have had the new explosive examined and tested by experts, who, it is stated, have pronounced favorably upon it. It is further stated that a motive force may be generated with the explosive by means of an engine constructed by the inventor, for which he claims superiority over steam and gas engines. The inventor has patented both the explosive and the engine in several countries. If patented, the composition cannot be a "secret." On the whole, this reads, the *Mining Journal* thinks, like our own American Keely motor.

SUCCESSFUL DESCENT OF THE AMAZON RIVER. Dr. H. H. Rashby, the eminent photoist, for nearly two years past has been exploring the resources of Peru, Bolivia and Chili, with respect to the supply and cultivation of cocoa leaves. His travels have been made on behalf of a prominent manufacturer of the new alkaloid known as cocaine. After finishing his cocaine researches, the doctor was authorized to return by way of the Amazon river, with a view to obtaining scientific information concerning the flora and other features of the region. From the mountains of Bolivia, he floated in a canoe a distance of some 3500 miles, reaching Para, in Brazil. This must have been a remarkable journey, full of perils and adventures. The scientific results of Dr. Rashby's travels will be awaited with much interest by scientists everywhere.

A SCIENTIST writes to a German publication in regard to nickel-plating zinc, which has hitherto resulted so unsatisfactorily, that it can be successfully and easily accomplished by first dipping the zinc into mercury. A fine plating of the nickel can then be secured on the zinc with even a feeble galvanic current, durable and susceptible to the highest polish. Any metal (German silver, for instance) that will not take a nickel plate easily can be treated in the same way with the best results.

A FIREPROOF TREE.—The *Gardeners' Chronicle* mentions a curious tree, a species of *Rhopala*, of contorted appearance, and growing to a height of about 20 feet, which is said by Mr. W. T. Thistleton Dyer to be absolutely indestructible by fire, and which survives in large districts in South America where the dry pastures and hush are burnt twice a year, and everything in the way of vegetable life is destroyed with the exception of this tree.

SOME fine granite has been found at Temecula canyon, San Diego county. It is considered by those who have examined it the finest deposit yet discovered in the State.

ENGINEERING NOTES.

American Mechanical Engineering.

Quite a compliment was paid to the commercial success of American mechanical engineers by a member of their English compeers at a recent meeting of the Manchester Association of Engineers. The occasion was a discussion on a paper upon "System in Engineering Works," in which the author, Mr. Hans Penold, dwelt at considerable length upon the manner in which the work of mechanical engineering business should be conducted, both in the shop and in the sale of the shop products. The subject was discussed under the different heads of—How to get orders? How they should be taken in hand to get the best and most economical results? And how to make the most of a workman's skill? The speaker made quite full reference to the last few years of depression, and of

German and American Encroachment.

Which had shown that in fabric the commercial department of English engineering works would have to bestir itself to find out where our markets were; if direct, or through what agencies the largest number of customers could be reached; and again, to consult the tastes of our customers more closely than has hitherto been done. In the discussion which followed it was generally admitted by the assembled engineers that in the points sketched,

American Machinists Were Ahead of English Firms;

In short, that their engineers seemed to have more commercial ability than the English had and were able to excel in the selling department. One feature in connection with American manufacture which was not very often found in England was commented upon by one of the assembled machinists to be that, "when a new article was being introduced in America, the question was what price it could be sold at in the market, and the manufacturer then laid himself out to produce it at this price. In England the cost of an article was very often based on what it had cost to produce the first half-dozen." As a commentary upon the foregoing it may be remarked that the United States is the only market in the world of which England is not independent for its supply of machine appliances.

GAS ENGINES FOR LARGE POWER are taking the place of steam engines in some localities in Europe. The works at Deutz, where Otto's gas engines are being built, are now busy with large motors of this class for driving mills and factories, instead of the usual steam engine. These gas engines are used in connection with a special gas-making plant, and it is stated that whereas the average consumption of an ordinary steam engine is 3½ lbs. of coal per horse power, the corresponding consumption of the gas engine is only 2½ lbs., and this economy has induced several works to replace their steam engines by large gas engines. Among these works are the zinc rolling mill of W. Grillo, in Oberhausen, where 10 gas motors supply an aggregate of 244-horse power; the Mechern Berg Werk Verein, where seven motors supply an aggregate of 174-horse power; the Russian company for the manufacture of powder in Schlussemburg, where 17 motors supply an aggregate of 194-horse power; a sugar factory in Elsdorf, where six motors supply an aggregate of 191-horse power; the water-works of the town of Coblenz, with 120-horse power; the municipality of Prague, with 150-horse power (for electric lighting); and the opera in Frankfort-on-the-Main, with two motors, having 100-horse power.

OIL AS COAL.—Notwithstanding the reported failure of oil as a substitute for coal on several of the ferryboats in San Francisco harbor, the official figures, as given in a late issue of this paper, show most unmistakably that oil is not only the cheapest and most economical of the two fuels, but that it also is productive of the least destructive influence on the boilers and furnaces. Why the boats went back to the use of coal is known only to those most directly interested. The public is only left to conjecture as to the reason. And now we have a report of a late meeting of the Northeast Coast of American Engineers and Shipbuilders of a discussion on "The Fitness of Oil in Place of Coal as a Fuel for Steam-raising Purposes," in which Mr. H. F. Swan (Armstrong, Mitchell & Co.) was able to speak of at least a dozen boats his firm had built for the Volga and Caspian, and he said all of these had been eminently successful. Other speakers followed in the same strain. So our California experiments should not be taken as any important factor in deciding this important question.

ELECTRICAL RAILWAYS.—Electricians are greatly pleased over the success of the electrical railway in Minneapolis. The train and load weighs 90 tons, and a speed of seven miles an hour is made, which is all that is allowed. In a short time the system is to be extended to other Western cities. The experiments being made in Europe are highly successful. Practical electricians predict that they will soon overcome every obstacle in the way. The first electrical railway on the Pacific Coast is just about ready to go into operation in Los Angeles.

USEFUL INFORMATION.

BRUSHING UP—USING MEANS TO AN END.

There are many ways of adding to the appearance of farm buildings and making a farm or country dwelling pleasant and attractive. Trees, shrubs, etc., judiciously set out, cost but little in time or money, and may be made both useful and ornamental. Then again the buildings themselves may be greatly improved and preserved by paint or some other application of color. Any intelligent person can add such attractions at a trifling expense. If paint is too costly, there are many kinds of white or colored wash which can be employed to both beautify and preserve the various structures on the farm—fences as well as buildings. All compounds of lime and albumen are more or less insoluble, and some of them answer almost as well as the more expensive oil paints. Milk and blood are both rich in albumen, and when combined with lime are very durable and if properly shaded and applied look almost as well as cheap paint. Color of any desired shade may be imparted by the use of cheap pigments. Get fresh, newly-burned stone lime and slake it with boiling water until it crumbles to fine powder. Then mix with skim milk to the proper consistency, adding one pound of gnod cement to the bucket of mixture. Stir constantly while mixing, and you will have a most excellent whitewash paint, which will hold on for a long time. The addition of a little flour paste will help it. The Germans make a very durable and cheap paint by using lime, as above directed, mixed with bullock's blood; apply it quite thick in consistency. If it appears to be too thick to lay on well, thin down with skim milk. Lime, blood and silicate of soda, mixed, also make a durable covering. Any person by intelligently using simple means may in a great many ways accomplish very important and useful ends.

A RETURN.—One of the novelties in Paris is a big wooden cow built in front of a cafe. The milkmaid milks a stream of milk punch into a glass, and a placard proclaims the astonishing facts: "France has sent Bartoldi's goddess to America, and America gratefully sends in return a milkmaid." Speaking of statues it may be remarked that Japan now reports two statues that would rival our "Liberty" in height, were they standing erect instead of sitting cross-legged as they are. These are both figures of Buddha; the first, near the City of Nara, is in a temple 156 feet high, and the figure which is seated cross-legged measures 53 feet high from the top of the low pedestal to the crown of the head. It is made of plates of bronze 6 to 10 inches thick soldered together. The face is 16 feet long by 9½ feet broad, and the width across the shoulders is 29 feet. The second statue is the Great Buddha at Kamakura, 15 miles from Yokohama. This is seated as the other, and is 49 feet 7 inches high.

WIRE GUNS.—We have already alluded to experiments in the manufacture of wire guns. It is stated that such guns are now being manufactured at Woolwich. The steel wire—which is rectangular in section, and is specially prepared for this purpose—passes through a testing machine before being coiled upon the steel cylinder, which forms the central portion of the gun. The testing machine consists of two sheaves placed upon horizontal spindles some distance apart, and revolved by power; while the wire which takes a few turns round each sheaf, passes over them. The speed of the leading sheaf is slightly greater than that of the other, and thereby a strain is put upon every portion of the wire as it passes through the machine. To prevent accidents in case the wire breaks, it is threaded through a gas pipe between the two sheaves.

BALL-POINTED PENS.—A new pen, known as the "ball-pointed," is being introduced. It is so made that the point of contact with the paper is a curved surface, and not, as in ordinary pens, a fine point, which is liable to stick in the paper or scratch along its surface. By adding this round point the inventor has designed a pen which approximates in ease and freedom of writing to the best quills. It may be held in any position, and neither scratches nor sticks in the paper. Its peculiar form also enables the nib to retain a larger quantity of ink than an ordinary pen, thus avoiding frequent dipping into the ink-well. The curved point has the additional advantage of preventing crossing, while it adds materially to the durability.

COMPOSITION FOR PICTURE MOLDINGS.—Dissolve one pound of glue in one gallon of water. In another vessel boil together two pounds of resin, one gill Venice turpentine, and one pint linseed oil; mix and boil together until water has disappeared, when add finely powdered whiting until mass is of consistency of putty. This is hard when cold and soft when hot. It can be molded in plaster of Paris or glue molds. The white base or groundwork composition is mason's hard finish. It would be advisable to drive brads or tacks where the high parts come to be bedded in the composition, and hold it in place.

TO MAKE FADED WRITING LEGIBLE.—A new discovery is announced whereby the faded ink on old parchments may be so restored as to render the writing perfectly legible. The pro-

cess consists in moistening the paper with water and passing over the lines of writing a brush which has been wet in a solution of sulphide of ammonia. The writing will immediately appear quite dark in color, and this color, in the case of parchment, it will preserve. On paper, however, the color gradually fades again, though it may be restored at pleasure by the application of the sulphide. The explanation of the chemical action of this substance is very simple: The iron which enters into the composition of the ink is transformed by reaction into the black sulphide.

TO REPAIR VULCANITE WATCH CHAINS.—The following is a very good way to repair vulcanite or rubber watch chains: If an attempt is made to open them cold, the links will, in nine cases out of ten, snap, especially stout ones; and if they do not break, the ends spring open and will not again close. Heating by fire or candle will burn them, but if held over the chimney of a kerosene lamp they will in a few seconds become so soft that you might bend them straight and shut them up again or close them as when new without injury to shape or polish. Horn or tortoise shell may be heated in like manner.

WINDOW GARDENING.—It is said that in growing flowering plants in pots, if large flower pots are used, there will be more leaves than flowers. It is often the case, that plants do not bloom at all because, having so much space, their strength is expended in forming roots and leaves. Window gardeners must have often noticed the masses of matted roots that are often found against the walls of the flower pot completely enveloping, with a heavy matting, the ball of earth in which the plant is growing.

FINGER-NAILS.—Somebody has been figuring out the annual growth of the average finger-nail. It appears that the growth is about three inches a year, or 10 feet during a life time of 40 years for a single finger. At this rate, the growth of all the finger and toe-nails of the world for four generations would furnish length of finger-nail enough to scratch the eyes out of the man in the moon.

WATER PROOFING FOR WAGON COVERS.—For a flexible water proofing for wagon covers: Take boiled oil 15 pounds, beeswax 1 pound, ground litharge 13 pounds; mix and apply with a brush to the article previously stretched against a wall or a table, washing and drying each article well before applying the composition.

GOOD HEALTH.

Petroleum as a Medicine.

Dr. Blache states, in the *Bulletin de Therapeutique*, that a refiner of petroleum having been prohibited by a prefect the distribution of petroleum in medicinal doses, the fact led to an inquiry being made as to its alleged utility in affections of the chest. The native petroleum from Pennsylvania and Virginia was that experimented upon first. It is a very safe substance, for even large quantities, when drunk by error; and in such cases has caused only a little nausea. In chronic bronchitis, with abundant expectoration, it rapidly diminishes the amount of the secretion and the paroxysms of coughing, and in simple bronchitis rapid amelioration has been obtained. Its employment in phthisis has been continued for too short a time as yet to allow of any opinion being delivered as to its efficacy, beyond that it diminishes the expectoration, which also loses its purulent character. The petroleum is popularly taken in doses of a teaspoonful before each meal, and after the first day any nausea which it may excite in some persons disappears. M. Gardy, a Paris druggist, has prepared capsules, each containing 25 centigrammes of petroleum, or, as he calls it, *huile de Gabion*, from the name of an ancient petroleum spring, and this Dr. Blache considers as the most favorable mode of administering it.

Kerosene and Diphtheria.

Dr. Wilson, of Meriden, Conn., asserts that the use of kerosene oil was in no slight manner accountable for the seemingly otherwise inexplicable spread of that mysterious malady called diphtheria, which recently caused many deaths in the town where he is practicing. He fortifies his assertion by the presentation of some confessedly startling figure results, from which it appears that the greatest percentages of fatal cases of diphtheria occur in households whose inmates employ kerosene oil to furnish them the necessary artificial illumination; and, further, his figures also show that all those who used either gas or candles, even when attacked by the malady, eventually reached a convalescent state. The Connecticut doctor's affirmations have evoked widespread interest, and the agitation of the topic appears to gather strength with the lapse of time, which, of course, is not to be wondered at, for the matter strikes closely home to the major portion of the people of this country. Mr. J. M. Starr, of Richmond, Ind., says he knows of half a dozen instances in that city where diphtheria had appeared in households within 10 days from the time the inmates commenced the partial use of kerosene oil either as an illuminant or as a feeder for cooking stoves.

All these reports are discredited by the physicians of the New York Health Department. Dr. Janca says that burning kerosene might

cause soreness of the throat in some cases, but he does not believe that it ever caused a genuine case of diphtheria. In New York diphtheria is not confined to houses where kerosene is used, but is equally prevalent in houses where gas alone is burned. Almost any disease will be aggravated by the fumes of badly-trimmed, filthy or smoking kerosene lamps.

Typhoid Fever.

Symptoms by Which the Disease May Be Recognized.

When a person becomes ill, suffering with slight chills, loss of appetite, frequent nose bleeding, irregularity of the bowels, coated tongue, rapid, weak pulse, body temperature rising about one degree daily until 105 degrees Fahrenheit is reached, with fugitive pains, especially in the back and head, with progressive muscular and mental weakness, and an inclination to be stupid, the presumption is very strong that the patient has typhoid fever, and this notion is much strengthened if, with the above symptoms, there be a tumid abdomen, gurgling on pressure on the right side.

These symptoms may exist about 14 days, and gradually abate, and the patient recover, but the patient may, on the other hand, go on from bad to worse, and finally be destroyed by exhaustion, perforation of the bowels, or bowel hemorrhage. If on examination of the body of one dead under the above circumstances there be found numerous patches of inflamed surface in the bowel known as "ileum," it is perfectly proper to ascribe the death to typhoid fever. The poison of the disease, which is probably a microscopic plant, exists mainly in the bowel evacuations of those sick of the disease. It is true that this substance has never been isolated and shown to men so one would show a sample of wheat or other seed, but it exists all the same, and when a person develops the disease it is because he has swallowed some of the poison with his drink, most likely, and it passes along the alimentary canal till it finds a good soil in which to grow—that is, in the position indicated, known as "Peyer's patches," a glandular formation bearing the name of a learned physician long since dead. It is probable that some in vigorous health might take small amounts of this poison into the system and escape unharmed. A temperature of 41.2 degrees—that is the boiling point—kills the poison of all zymotic diseases. Here is the sum of the prevention of the trouble: Maintain a high state of the general health and boil all suspected water before using. In fact it is well to use nothing but boiled water when any epidemic disease prevails. Some typhoid fever patients will recover by rest in bed, and using only liquid food. Others will die in spite of the best of attention. These last are either constitutionally weak or received enormous doses of the poison. Enteric fever is the better name for the trouble in question.—*Medical Journal*.

WHERE TO DIG THE WELL.—Let us remember that a well will drain an area with a diameter equal to twice its depth. Therefore, a well 12 feet deep will drain an area the diameter of which is 24 feet, that is to say, that it will drain the surrounding soil for 12 feet in every direction. Obviously then the privy should be more than the depth of the well away from it, and more than this again if it is proposed to place it on a higher level, which, however, should never be done. The well should be lined inside thoroughly with mortar so that percolation cannot occur between the crevices of the bricks, and it should be well covered, so that surface drainage cannot get into it, for you want to drink water that has come into the well from the bottom, after it has been purified by filtration through the earth. Thus, then, these are the precautions to be observed in locating and building your well in the country. How about the city? Well-water in the city should never be used; the sources of contamination are too numerous and too hidden to be avoided.—*Annals of Hygiene*.

YELLOW FEVER AND MOSQUITOES.—A somewhat curious theory is that of Dr. Carlos Finlay, of Havana, who contends that yellow fever is not transmitted through the air nor by contact, but by inoculation, which is largely performed by mosquitoes. These creatures bite victims of the disease, become infected themselves, and so convey the germs to the blood of other human beings. To support this view, Dr. Finlay mentions that yellow fever was less prevalent in Havana during the unusually hot summer of 1885, when mosquitoes were scarce, than in the late autumn when the insects were numerous. He even goes so far as to conclude that this affection cannot be epidemic where the tropical mosquito does not abound.

THE LENGTH OF A STEP.—Dr. Gilles de la Tourette has recently published a monograph upon normal locomotion and the variations in the gait caused by diseases of the nervous system. He found, from a comparison of a large number of cases, that the average length of a pace is, for men, 25 inches; for women, 20 inches. The step with the right foot is somewhat longer than that with the left. The feet are separated laterally in walking about 4½ inches in men, and about 5 inches in women. The ataxic gait is characterized by an actual shortening of the pace coinciding with an apparent lengthening, and by a considerable increase in the lateral separation of the feet.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

PIONEER DISTRICT.—*Ledger*, Jan. 1: In this district a new strike is made occasionally, which helps to give an impetus to prospecting. This district is essentially a "poor man's digging." The veins are small. They nowhere assume the dimensions of a load or fissure. But they are exceedingly rich, far surpassing the average yield of quartz met with along the main belt. Moreover, they are found near the surface. Recently Jake Greisbach made another strike close to the old Pioneer ground. He has taken out a considerable quantity of rock, which appears to be of rich grade quality even for this district of high-grade ores. It is estimated to be worth at least \$60 per ton. He will soon have a crushing made at Mace's mill. This mill has lately crushed 11 tons of rock from Gardner's claim, formerly Len Harmon's mine. It averaged about \$50 per ton.

SARGENT MINE.—This claim at Middle Bar, which was bonded about 12 months ago by W. Petre in the interest of English capitalists, has been abandoned. The shaft was sunk to a depth of nearly 200 feet. Small veins of quartz met with, similar in character to that of the St. Julian adjoining, but the metal was not so rich. They paid \$2000, or 10 per cent of the purchase-money, on bonding the property, and have expended from \$5000 to \$8000 besides. The mine with all the improvements erected by the bonders will doubtless fall back to the former owners.

MISCELLANEOUS.—R. O. McKean and F. Goodman have struck some very good gravel on Sutter creek, six miles above Volcano. They are placing a quantity of pipe in position, and preparing to work it in good shape this winter. The supply of water will be drawn from Mill creek. The old Volcano ditch, which carries water to the Hadley and other claims on Rancheria creek, will not be operated the coming season. The revenue from the sale of water has not been sufficient to pay the operating expenses for several seasons past. The New London is down over 700 feet. They will go at least 800 feet before drifting. The lumber for the additional 40 stamps to the Pacific mill is arriving on the ground, but the work of erection has not yet been commenced. It is reported that the contract for building the mill has been let to a San Francisco firm, and that most of the mechanics will be sent up from the city. The McKenzie Brothers, who have for some months been developing a claim on Ratto's ranch near Clinton, are confident they have a valuable property. By means of a tunnel they have struck a fair-sized quartz ledge at a depth of 170 feet from the surface. The rock is apparently of good quality and prospects handsomely. At another point on the claim the surface croppings indicate a ledge of much larger dimensions. A gentleman is up from the city to inspect the property to report to capitalists who are thinking of purchasing. It is reported that the purchase price of the Wildman mine, Sutter creek, is on deposit in one of the banks of San Francisco, awaiting the arrival of John Tregloan, the agent of the purchasers, who is on his way from the East. The Plymouth Mining Co. will pay, on January 5th, dividend No. 44 of 25 cents a share, or \$25,000, making total amount paid to that date \$1,875,000.

Butte.

PNEUMATIC MINING CO.—*Oroville Register*, Dec. 30: The bed of Feather river with its adjacent bars and banks was among the richest mining sections of California during the flush times in this State. Owing to the trouble with water, very rich beds of gravel were left unworked. These the Pneumatic Mining Company began to work on last summer, and were successful in striking rich pay; so rich that seven dollars to the single panful of dirt was taken out. Owing to the machinery for forcing the air in so as to keep the water back, getting out of repairs, the drifts filled with water. Duplicate engines and boilers were put in which took about one month's time. When the drifts filled, air leaks were caused by the inward flow of water, to remedy which, time will be required to solidify the ground. This may take two months, and in the meantime it is proposed to sink a new tube on another part of the claim. No change will be made in the location of the machinery. Work will probably be recommenced about the first of next week. The expenditures of the company cannot have been less than \$30,000 in developing this mine. The gravel is very rich and it is safe to predict vast sums of gold will be taken out when the company gets fairly to work.

Calaveras.

THE STICKLE MINE.—*Mountain Echo*, Dec. 29: The Stickle mine in this town, under the superintendency of Mr. W. A. Nevells, is being worked with a vim that betokens business and prosperity. Stopping is being carried on vigorously in the north end on the 400-foot level, where considerable work was required in the way of filling up the stopes in order to reach the ore body with the Burleigh drills. This work has just been completed, and the drills are playing sad havoc with the large body of ore before them. The ledge on the 400-foot level is between 25 and 27 feet in width and of a medium grade. Work is being carried on as briskly on the 200 and 300-foot levels, where stopping north and south is being prosecuted with considerable activity. Everything in the mine is in first-class condition; the chutes, which are always well filled with ore, are so arranged as to admit of car-filling with considerable ease. There is now enough ore in sight to keep the mill in operation for three years. Mr. D. P. Pierce, the assistant superintendent, informs us that he has managed to employ 30 men to good advantage and accomplish the same amount of work formerly done by 40 men, and that the expense for running the mine has been greatly reduced under the present management. As near as we could learn, it can be safely estimated that \$6000 per month will be the average yield from the ore that is now being mined. The plates are cleaned daily, instead, as formerly, at the end of a month or six weeks' run. Mr. Pierce claims that a large amount of gold is saved by this way, which by the old method passed over the plates unobserved.

MURPHY'S.—*Calaveras Citizen*, Dec. 26: Notwithstanding the tardiness of the water in visiting us and moving the wheels of industry in mining and farming, we are moving on prosperously and everything looks well for the future. Mining in all its branches never looked better, and reports coming in from all quarters guarantee the best results. The want of water is a great drawback for placer mining and mills, but beneficial for sinking to greater depths. The Oro Plata is running night and day, up to its full capacity. Stamps and pulverizers are in motion, reducing nearly 100 tons of ore per day. When the compressor is started up, more men will be given employment, and greater activity will be noticeable. The management is able and directed in an intelligent manner. From the Esmeralda mine on Indian creek the news is very encouraging, and this section bids fair to rival in extent and richness any section in the county. A feeder for the new mill, now nearly completed, is of a new pattern, and noted for its completeness.

A GRAVEL MILL.—*Calaveras Chronicle*, Jan. 1: A gravel mill is in course of construction on the old "Concentrator" claim at the head of Jackass gulch, near the hospital of the French Mutual Relief Society of this place. The claim has lain idle for several years, but during the past few months the old tunnel has been reopened and the work of prospecting has been pushed ahead energetically. Various drifts have been run to explore the ground and find its quality and extent, and we are glad to say that the result of these explorations has justified the company which has gone into the enterprise to erect a gravel mill and open the mine in proper shape to work it. During the past week or 10 days a number of teams have been engaged in hauling lumber from the mountains for the construction of the mill and necessary buildings. The heaviest of the lumber, such as mortar blocks and frame timbers, are already on the ground, and the mill building put up so that work can be prosecuted in sunshine or in rain without interruption. The work is going on as fast as skilled workmen and able-bodied men can perform it. The weather up to the present time has been very favorable to permit the heavy hauling to be done. It will not be long before the mill will be up and ready to crush gravel, of which developments have proven the existence of an abundance bearing gold sufficient at least to make it a good dividend-paying mining property, if not a bonanza. The mine is under the management of C. M. Burleson, Esq., of Rocklin, Placer county.

El Dorado.

VANDALIA.—*Cor. El Dorado Republican*, Dec. 30: Yesterday I paid a visit to the Vandalia mine. I found the superintendent, Mr. Kelly, at the mill. They were cleaning up, and the plates were well charged with amalgam. The mine is paying well. They have a No. 1 5-stamp mill, run by steam power, with everything new and improved machinery. The property is very valuable and a sure success. The price paid for this mine to Marks was \$20,000. In a short time they will have all their money back. The Big Canyon gold mine, formerly known as the Oro Fino, has one of the best mills of the size in the State. Twenty stamps will start up today. They have the latest improved machinery—the best that can be obtained. The mill runs by water.

Fresno.

HILDRETH MINES.—*Fresno Expositor*, Dec. 29: The stages from Fresno and Madera continue to arrive tri-weekly with their full complement of passengers, and all look as though they were bent on doing something to make a winning on some "lay-out." This speaks well for the increasing population of Hildreth, and it certainly will be an important mining district in the near future. Of the late discoveries of importance in ledge matter none compare with that owned by Barney and Harry Clark, and popularly known as Ireland's Pride. Their property is unusually favorably situated, being within a few hundred feet of the San Joaquin river, where they can utilize the great water power of that stream. Their shaft is down 60 feet on a ledge of ore that mills \$30 per ton. At present they are drifting on the ledge from the ravine, being in 40 feet. They have 20 tons of ore on the dump, but will not start milling until the dump has been increased to 300 tons. Francis & James have been offered \$16,000 for one-half of their claim. No definite idea can be given of the extent of the ore body, for what they consider waste and which is thrown over the dump will mill \$10 to \$12 per ton. Their richest rock will go into the hundreds, while the second and third-class grades will mill from \$40 to \$80 per ton. The sulphurets are very good. The latest find has been recorded by H. Towers and James Curby, lying east of the Hanover mine. McNally is working the Stockton mine. When once started with a full force this property will excel the Abby mine. The Dahlonega mine, owned by O. M. Gaddis, Geo. W. Grayson and Mr. Nicholson, is the south extension of the Lily mine, which was sold lately for \$25,000. The Dahlonega mine is a fine property, having a strong and well-defined ledge of good milling quartz that prospects \$35 per ton; value of sulphurets unknown.

Inyo.

SAMPLING WORKS.—*Register*, Dec. 30: The mining business bordering on this valley along its length of more than a hundred miles is essentially of a chloriding nature. There are perhaps a hundred different mines from which ores are being extracted in varying quantities and kinds, and sent out of the country for reduction. A reliable sampling establishment at some central point on the railroad would do a paying business for itself, and at the same time promote the mining industry wonderfully—with a good concentrating plant, it would be just the thing.

ORE SHIPMENTS.—Many carloads of ore have recently been shipped to the new works at Reno in addition to what we may call the regular shipments from Lookout, Darwin, and Cerro Gordo. Heretofore the most of the ore shipped has been silver-lead, but about ten cars of the recent shipments are gold ores, with different lots of high-grade silver ores, some of the latter assaying as high as \$1500 per ton and over. These lots are from different mines and from both sides of the Inyo range.

MARBLE QUARRY.—*Inyo Independent*, Jan. 1: The new mill at the marble quarry was started up last week. Everything worked well, except that the speed was too great, and a stop had to be made to gear down a little. Mr. Luce says of the quarry: "The quarry improves with every step, and is devel-

oping splendid, just as I saw by the eye of faith, based upon past experience, for had it not improved it would have belied all the past, both ancient and modern."

Nevada.

LONE TREE MINE.—*Tidings*, Dec. 24: The Lone Tree Mine, below Forest Springs, and owned by a company of gentlemen in Gilroy, is now looking first-rate. There are four feet between the walls in the drift and most of it is solid ledge. The ledge has been large for some time, but Mr. Cohoe, the efficient and experienced superintendent, has never deemed it advisable to crush the rock, as he thought it did not carry a sufficient amount of gold. The last two or three days the ore has much improved, and shows gold quite freely, besides the rock being of general good quality. It is almost certain that there is a good-paying mine there, and the company intend to find it.

San Bernardino.

TO START UP.—*Calico Print*: The five-stamp mill of the Bahten Bros. at Providence is about to start up. Its motive power has a capacity for ten stamps and it is expected before long that five more stamps will be added. The Perseverance mine from which the ore is taken adjoins the Bonanza King, and has as good a showing as the latter when it was opened up. The Bahten Bros. have bonded the mine to an English lord, and on the 25th inst. he is expected to take charge of the property.

Shasta.

THREE MILLS.—*Shasta County Democrat*, Dec. 29: The mining interests of Old Diggins are looking up. Three good mills are now running in the camp. Andy Fife's mill on the river opposite the mouth of Spring creek was completed last week and is now ready for custom work. The mill was started up on ore from the old Spanish mine in Old Diggins. Senator Foster, of Tehama county, and John Q. Finch, of Anderson, both of whom are largely interested in mining property in Bully Chooch district, were in town last Sunday, looking for teamsters to haul machinery from Anderson to the mines. The senator is putting up a 10-stamp quartz mill in the place of a Hill crusher which he has been using as a prospecting mill. The machinery for the new mill arrived at Anderson. He has great faith in the Bully Chooch mines, and thinks it will be one of the liveliest mining camps in the State next summer. Mr. Ellis, of Round Mountain, who was in town last Sunday, informed us that it is the general report in his neighborhood that the Afterthought and Donkey mines at Furnaceville were recently purchased by a Nevada mining company owning reduction works at Elko. He could not vouch for the truth of the report, but in that connection stated as a fact that some weeks ago several tons of ore from the Afterthought was shipped to that company and the ore was worked successfully, and it is supposed that this led to the purchase of the mines. The Redding Reduction Works Co. having bought ground for the plant near the gas works, will commence to-day to grade the ground for the machinery which is now on the way, and as soon as finished will be able to work any class of ore or sulphurets in Northern California successfully. Parties having mines developed showing in sight enough ore to pay for a plant that will work the same successfully, can have a plant built upon their mine and pay for the same from the receipts of the mine. This company claims to have ample means to back any contract they may make. The success of the enterprise will greatly enhance Redding's future.

Sierra.

SIERRA BUTTES.—*Mountain Messenger*, Jan. 1: The No. 9 tunnel at the Sierra Buttes mine is in about 7500 feet. Another upraise has been started to connect with the upper level, which is in about 700 feet. The distance between the two upraises is about 1500 feet. T. P. Kelly has the contract for getting logs for the Empire Mining Co. mill, at Gold Valley, next spring. The company owns a sawmill and will need about 350,000 feet of lumber next spring. The company has very rich rock and sulphurets, and there seems no doubt of their making the mine a success. Van Slyke has struck the ledge in the lower tunnel, at the Gold Bluff mine. The rock prospects very well, and the outlook for the mine is very bright. From the point where it is tapped by the new tunnel it is about 700 feet to where the ledge cropped on the mountain above. There is about 250 feet of the ledge unworked, above the present tunnel.

Trinity.

A GOOD STORM.—*Journal*, Jan. 1: Weather the past week has been favorable to the hydraulic mining interest, and the expression, "the best storm of the season," was frequently heard. It has rained most of the time in "the basin," with snow on the higher hills, and miners are now all at work with a fair supply of water. More storm of the same kind is prayed for at an early date in order to insure a good mining season. During the week 3.62 inches of rain has fallen, increasing the total for the season, to the close of the year, to 13.69 inches. To the same time last year, 23.89 inches had fallen.

Tuolumne.

SILVER IN TUOLUMNE COUNTY.—*Union Democrat*, Jan. 1: There has lately been opened a valuable and interesting mine on Turn Back creek, about one mile above the junction of the creek and the main Tuolumne river. The development of the mine consists of a tunnel driven 115 feet on the vein which varies from 2½ to 5 feet, and also of an opening on the outcrop of the vein 75 feet above the tunnel level where the vein, being five feet wide as far as now open, shows strongly and carries the same character of ore as that in the tunnel. The formation is slate on both sides of the vein and the ore is largely impregnated with graphite or plumbago. It is soft and easily mined. The ore was a short time ago submitted to Mr. Louis Blanding, who pronounced it to be silver bearing, and his tests proved this to be true. An average sample of the ore was also sent to Prof. Thomas Price, of San Francisco, for assay, and he gave a return per ton \$12.54 in silver and \$6.20 in gold. Last Tuesday Mr. Blanding visited and inspected the mine and was much pleased by its favorable location for rapid and economical work, and regards it as having exceptionally good natural advantages, and states from his experience in the treatment of ores on the Comstock and elsewhere that the ore can be mined and milled for \$6.00 per ton. This is an important discovery to the mining industry of the county.

NEVADA.

Washoe District.

HALE AND NORCROSS.—*Virginia Enterprise*, Dec. 30: 1300 level—Main south lateral drift advanced and timbered 38 feet, making a total distance of 168 feet. Face in good vein material. West crosscut No. 1 from this drift advanced and timbered 35 feet, making a total of 45 feet. This drift has passed through some very good stringers of ore, and the last 12 feet of it is all in good ore, portions of which are of very high grade, giving rich assays. It is 90 feet south of the shaft, and 100 feet north of the Chollar line, 1200, or seventh station level—Main north lateral drift advanced and timbered 36 feet; total length, 88 feet. Main south lateral drift extended and timbered 40 feet; total length, 100 feet. All the drifts above mentioned are in good working condition, and all continue in the same vein formation as at date of last weekly report with the exception of the improvement noted on the 1300 level. At the main vertical shaft 1000 feet of 20-inch air pipe has been put in.

SAVAGE.—500 level—South drift advanced and timbered 35 feet south of crosscut No. 1, and continues in the same quality of ore as is shown in the west crosscut. 600 level—The excavating for the working station on the west side of the shaft is progressing well. Another west crosscut, No. 6, on this level, has been started at a point 375 feet south of the north boundary line, which is extended 40 feet in favorable vein material. The sinking of the winze in the ore body, below that level, has been temporarily discontinued. 800 level—West crosscut No. 1 has been advanced 34 feet, making its length 54 feet. West crosscut No. 2, 55 feet south of No. 1, has been extended 34 feet; its total length now being 50 feet. Both of these crosscuts are in quartz which gives low assays. West crosscut No. 3 is 76 feet south of No. 2, and is in 30 feet. 1640 level—Main north drift advanced in the quartz ledge a distance of 25 feet, and the main south drift, 16 feet. The hoisting or galloways frame over the shaft will be completed next week.

CON. CALIFORNIA AND VIRGINIA.—Work in the mine, by the gas from the smoldering fire in the timbers of the old bonanza workings, was interfered with to a considerable extent, but the difficulty has been perfectly overcome by solid, substantial and effective bulkheading, so that now everything is all right once more, and the usual output of ore resumed. A full force of miners were put on at the 1400, 1500 and 1600 levels Wednesday night. In fact, as many men as possible have been put to work in order to make up for lost time in the ore production. The ore cubes were all full, and 100 carloads were shipped off on Thursday, with a similar export yesterday to the Eureka and Morgan mills, on the Carson river. The assays from the mill battery samples for the week average about \$49 per ton. A heavy shipment of bullion will probably be made Sunday evening to San Francisco.

POTOSH.—250 level—Main south lateral drift extended 32 feet, showing ore of fine quality and value. The north winze, being sunk below the floor of the Lindsay drift, is down 28 feet, and continues in the same good ore. The upraise above the southeast drift from the Chollar line is up 40 feet, and still in good ore. The company not being able to secure milling facilities at present, the ore has accumulated in the drifts, wherever it could be stored away, while further exploration work could be conducted.

OPHIR.—Considerable work had to be done in the way of bulkheading the connections with the old Con. California and Virginia on account of the smoldering fire and gas. This being completed, work goes ahead as usual in the explorations on the 1065 and 1300 levels, advancing the main south lateral drift on the 1065 and the south lateral drift on the 1300. This last-mentioned drift corresponds with the 1435 level of the Con. California and Virginia mine.

BULLION.—In the reopening and repairing of the old Croesus shaft, 50 feet of progress has been made during the past week, making a total of 177 feet. As the shaft had caved and filled in solid from the surface and had to be virtually sunk and retimbered over again, this can be considered pretty good work. The new surface machinery operates splendidly, and the whole concern is well managed.

QUINN MINE.—Good progress continues to be made in the erection and placing of the new hoisting works and machinery over the old shaft, preparatory to repairing and sinking the same 100 feet further to where rich deposits of ore were known to extend from the old workings before the disastrous explosion which destroyed the surface works five years ago.

YELLOW JACKET.—Daily yield, 150 tons of low-grade ore from the old workings in the various levels, from the 1300 up. The old ore breasts and stopes in this mine are seemingly inexhaustible, and good effective exploration work is all the time being done toward the further development of the mine, above and below.

OCCIDENTAL.—The usual good progress of advancement made in the drift north from the north incline winze, 48 feet below the track floor of the upper tunnel, and about 18 or 20 tons of fair-grade ore were extracted during the week. The upraise above the lower tunnel was advanced 10 feet; total, 38 feet.

BEST AND BELCHER.—600 level—West crosscut advanced 45 feet, making a total of 105 feet. 1500 level—Station work at the shaft completed and the drift northeast from it advanced to a total extent of 147 feet. Material in all these drifts of a favorable nature—vein porphyry, quartz, clay, etc.

BALTIMORE.—The repairing and retimbering of the main shaft is completed from the 225 level up 125 feet, having 100 feet yet to be done extending to the surface. The work is being prosecuted very energetically under Foreman O'Donnel, and the surface machinery is in perfect order, ready to steam up as soon as required.

TOWA.—Tunnels A and B have made good drives during the week. The headers of both tunnels are now in very close rock, which is thought to be the casing of the main ore vein. It is expected that both tunnels will cut through into the vein during the ensuing week.

ANDES.—230 level—Excellent progress continues to be made cleaning out and repairing the main west drift.

KENTUCK.—The daily output continues to be

about 50 tons of ore from the 800 level and the old workings above. There is a whole wilderness of low-grade ore in this mine yet, with a streak or two occasionally of high-grade.

JUSTICE.—350 level.—The recent rich developments of gold ore in the south drift has induced the sinking of a winze to explore it in depth. A station is being chambered out for the purpose.

UTAH.—472 level.—The lateral north drift started from the main west drift was advanced 36 feet; total length 81 feet. Face is a hard vein porphyry formation.

UNION AND MEXICAN.—1300 level.—Operations confined to running the joint north lateral drift and the crosscut east from it. Both in very favorable vein formation.

ALPHA AND EXCHEQUER.—The new hoisting works building over the old Alpha shaft is nearly completed, and the main hoisting engine is being placed in working position to-day.

ALTA.—720 level.—An upraise is being made in good ore above this level in the old Keystone vein. 800 level.—A winze is being sunk to the good ore body, 22 feet wide, which was passed through by the crosscut east from the winze sunk from the 720 level.

CHOLLAR.—The cleaning out or resinking and retimbering of the old shaft continues making excellent progress, having attained yesterday the depth of 360 feet.

GOULD AND CURRY.—425 level.—South lateral drift from main west drift cleaned out and retimbered to the total extent of 429 feet. Material in face, vein porphyry, quartz and clay.

WEST POTOSI.—This is an eligible new mining location, lying to the west of the Potosi mine, and adjoining the bullion on the south.

SIERRA NEVADA.—520 level.—The main south lateral drift was extended 28 feet, making a total of 77 feet in length. Face in vein porphyry and quartz, giving low assays.

SILVER STAR.—The first-class new whim over the shaft for hoisting purposes is about completed, and ore extraction is next on the program.

CROWN POINT AND BELCHER.—Daily yield 380 tons from the 1500, 1600 and 1700 levels, with some contributions from the old workings in the levels above.

EAST BEST AND BELCHER.—Repairing shaft and hoisting works building preparatory to energetic resumption of work.

NORTH GOULD AND CURRY.—Two shifts of men are employed reopening and repairing the shaft.

Bartlett Creek District.

GOOD RETURNS.—*Silver State*, Dec. 29: Frank Raymond has had some samples of rock from the Crescent and Concord, two new mines recently discovered at Bartlett Creek, assayed. The ore from the Crescent assayed \$158.25 in gold and \$36.10 in silver, and that from the Concord \$13.50, principally gold. He says the Crescent is from three to four feet wide, and the Concord is an immense vein. The Crescent ore ought to pay well, even if only the gold could be saved. Some of these days there will be a boom at Bartlett Creek, and the mines of that district will be worked extensively.

Oberly Creek District.

BRIGHTENING PROSPECTS.—*White Pine News*: From Alex. McDonald, who was in town a few days ago, we learn that the prospects of the old camp are brightening. The Exchequer people are getting ready to start their mill. An important strike has been made in the Ticup by the lessees. But the most promising of all is John Wearne's find in the Wanderer. This mine adjoins the Chance, and is about four miles north of the town. Twenty feet has been sunk on the vein, and a large body of ore uncovered that averages over \$50 to the ton. Four men are at work on it, and it looks as if a big mine will be uncovered there.

Eureka District.

ORE SHIPMENTS.—*Sentinel*, Dec. 29: During the past week ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Richmond works—Dunderberg, 88 tons; White Pine, 6 tons; Flynn, 1 ton; Silver Lick, 21 tons; Hoosac, 5 tons; Williamsburg, 10 tons; Geddes and Bertrand, 6 tons; Bullwhacker, 1½ tons; Marguerite, 4 tons. Eureka Con.—Morey, 7½ tons; Geddes and Bertrand, 1 ton; Fraser and Molino, 1 ton; Phenix, 70 tons; Jackson, 140 tons; General Lee, 3 tons; Diamond, 18½ tons; Grant, 5½ tons; Queen, 10½ tons; Barcelona, 9½ tons.

Kinsley District.

A STRIKE.—*Salt Lake Tribune*, Jan. 1: This old mining district is about 50 miles northeast of Cherry creek. Several Salt Lake business men have struck a rich plum in the Morning Star mine, Kinsley District, Elko county, Nevada. The shaft is down now 85 feet, where has been found from two to four feet of ore yielding 27 per cent lead and 179 ounces silver. The richness of the ore dispenses with concentrating and the ore is hauled 70 miles to Toano on the Central Pacific. A carload arrived in this city yesterday to be put on the market. But the chances are against the ore coming to this city or going to Denver, as the Central Pacific proposes to make it for the interest of all miners along its line to ship ores to the new Reno smelter. The owners of this new bonanza are M. H. Lipman, D. W. Scribner, Wm. McCrae, T. J. Barker, and Coal Agent Colton; the last two holding one-eighth interest each, and the other three one-quarter each.

Mount Rose District.

PARADISE.—*Cor. Silver State*, Dec. 29: The Paradise Mining Company are pushing the work of development ahead with great energy, and their well-directed and judicious efforts will surely be crowned with success in the near future. The Cliff mine is lying idle at present, but rumors say that the owners will soon commence work on it. Mr. John Brannan has been doing the assessment work on the Rattler and some other claims. The Rattler is a splendid property, which has yielded considerable high-grade ore, but it is impossible to do anything without capital.

Patterson District.

MILL.—*Pioche Record*, Dec. 23: W. B. Ayres departed last week, having completed the steam stamp mill for the Patterson Silver Mining Company. The machinery works satisfactorily to the

owners, but the addition of a dryer and roaster will be necessary before any good results can be expected. Mr. L. Holbrook, one of the owners of the above-named company, paid Patterson a flying visit last week and expressed himself pleased with the improved appearance of the mines under development. Mike Riordan and partner are working the Orient mine, and have about 10 tons of 80-ounce ore on the dump. John Krimer and Wm. Warner are sinking on the Hercules mine, in which Hon. W. G. Lyons and Johnny Cupid, of White Pine county, are interested. The bottom of the shaft looks favorable for a body of ore, in character similar to the rich bowlders which they had on the surface.

Reveille District.

PROSPECTS.—*Cor. Belmont Courier*, Jan. 1: Districts near us are also quite prosperous. At Reveille the usual amount of chloriding is being done, and I am informed that the Norris Brothers have leased the Gila mill and mine for quite a length of time and propose to run the same as circumstances may justify. They have now a number of men at work in the mine with good results. They propose to run the mill on such ores as they may extract and buy and upon the tailings awaiting reworking at the mill.

ORE AND BULLION SHIPMENTS.—*Park Record*, Jan. 1: For the week just ended the Crescent made the first winter shipment, since the tramway closed down, of 559,710 pounds of first-class ore. The Daly bullion product from the Marsac mill for the week was nine bars, containing 10,406 fine ounces of silver. The Ontario shipped on the 27th inst. 33 bars of bullion, containing 18,778.5 fine silver ounces. The Mackintosh sampler received during the week 663,690 pounds of Ontario and 259,450 pounds of Daly ore; total, 923,140 pounds.

Tybo District.

THE NYE CO.—*Cor. Belmont Courier*, Jan. 1: First and most important are the operations of the Nye Mining Co., but the developments now being made in other properties here will no doubt add materially to the prosperity of the place. Mr. Trowbridge, as manager of the Nye Mining Co., proposes to erect, as soon as the weather opens in the spring, concentrating machinery for the purpose of collecting the free globular lead from the iron products of the old furnace dump, and also the galena from what are known as the "black jack" ores of the 2G. When this machinery is in operation it will give employment to at least 50 men in the mill and mine, besides those engaged in outside work. The developments in the Dimick mines are showing very favorably for that property. There are now out some 75 to 100 tons of ore. Recent work in some other mines near Tybo has shown fine prospects, and altogether the mining outlook here is cheering.

ARIZONA.

COAL.—*Silver Belt*, Jan. 1: Charles Slack, who has just returned from the Deer creek coal fields, where he has a valuable claim, informs us that he delivered to the Mammoth Mining Company, on the San Pedro, 10,400 pounds of bituminous coal which was tested by the company, and pronounced satisfactory. Mr. Slack expects soon to bring several hundred pounds to Globe to be tested.

COLORADO.

MINING SALES.—*Rosier Silver Nugget*: We continually hear of mining sales all over the State, and predict a change for the better in mining matters in the near future. One hundred and forty sacks of excellent ore were shipped from the Victoria mine last Friday. Mr. Robt. Daniels and Harry Hender-shot in charge, are pushing development on this property and expect to make another shipment in the "sweet pretty soon." News reaches us from the owners of the Ben Eaton mine that this valuable property proposes working all winter and will be ready to make ore shipments in the near future. Yesterday morning they commenced placing necessary machinery on the property to sink the shaft 250 feet from its present depth, and expect to have it in good running order with the coming of the New Year.

AT THE LITTLE MOLLIE.—This property is eligibly situated in one of the richest portions of this section. It was lately bonded to some Denver capitalists for a large sum, who are systematically speeding development. The mine is being operated under the direction of Mr. Pres. Bailey. Six men are employed under foreman Chas. Collins, and considerable ore has been taken out. A shipment of several tons was made this week, and if the returns are satisfactory the management will at once put on a large force of men, and also put in hoisting machinery. The property shows a continuous streak of ore in the shaft. The Saratoga mine, on Brown mountain, is another piece of property that is showing up splendidly as development proceeds. They are working eight men in opening new drifts, sinking winzes, making connections and blocking out the ore, which is a rich carbonate. A large quantity is being taken out and stored for shipment. The mine is bonded and leased, will be worked all winter and will probably be sold in the near future.

HIGH-GRADE ORE.—*Georgetown Courier*, Dec. 23: Two new bodies of high-grade ore were opened in the Astor mines this week. The quality of the ore still holds with increasing size of mineral bodies. Air became so bad some time since in the Bonanza tunnel drift on the Rogers, that work had to be discontinued. An air compressor is now being put in. The heading on the Hood lode has broken into mineral. Past experience leads Mr. W. B. Hood, the owner, to believe that he is on the edge of a pocket of good ore. R. S. Putt and his three partners have struck it rich on Silver Creek. Their claim is supposed to be the east extension of the Two Sisters lode, and is called the Elida. A six-inch vein of high-grade ore was struck a number of days since in the heading of the adit. It would take just \$40,000 to buy them out. A new placer mining company is being formed in Georgetown and Silver Plume to work some good placer near the foot of the range. The country between Georgetown and the top of the range will enjoy unprecedented prosperity the coming season. The newly discovered lodes around Gray's and Irwin's peaks and the new placer diggings will give the west end of the county new life and activity.

GRAPHIC.—The Graphic mine, now in charge of W. E. Koneman, superintendent, and G. S. Chisum, assistant, is employing 45 miners on two shifts.

The boys are shooting out ore from the intersection of the Graphic and Review leads. This mineral is of a much higher lead and silver value than that heretofore encountered in the former property, and the ore body hides fair to improve in volume, though it is now of important magnitude. The Graphic Min. Co. is shipping 60 tons daily on an average. A. Hasty is working a contract in the Review mine, and is dumping fine lead ore. Frank Wilson has completed assessments upon a number of valuable properties in the San Andres districts. One hundred and twenty-eight cars of ore, destined for treatment by the Socorro plants, arrived on one day this week. Reports reach us as we go to press of important gold and silver strikes in the Oscuras, Polvadero and San Felicité districts. More assessments have been performed during the present year in this county than at any time since mining became the main industry of our people.

IDAHO.

CUSTER.—*Idaho Messenger*, Dec. 28: What is generally known as the Morrison Group, on Jordan creek, is said to be looking unusually fine. If this be so, they are wonderfully good now, for on former occasions they have surpassed anything we ever saw. Messrs Morrison & Pierson are shipping their rich ore up to the old Estis astrata on Eight mile, where they are going to work it. The General Custer Mill Co. does not work custom ore now, we understand; perhaps the reason is they have more raised daily out of the Luckyboy mine than their 30-stamp mill can reduce. The manager of this mine, Mr. Wm. Toole, tells us that the Luckyboy is producing 50 tons per day with a force of 40 men; and the ore is of so good a grade that the superintendent of the Custer Co. informs us that he will produce more bullion this month than has been done for any month for five months passed. His help has been somewhat reduced at the mill, of late, and the hands are more tasked than in former days; but we saw no one whose labors appeared more constant and arduous than those of the superintendent.

MONTANA.

A GRAND ENTERPRISE.—*Butte Miner*, Dec. 22: Within the past few days the Wortrich Mining Company, with a capital stock of \$2,000,000, consisting of 100,000 non-assessable shares of \$20 each, was incorporated in Helena to work and develop the mines near Marysville, discovered by W. L. Wortrich, and said to be unusually rich and extensive. The company consists of Henry Klein, president; T. H. Kleinschmidt, secretary, L. Wortrich and others. The mine intended to be worked is an extension of the celebrated Drumlunnon, and is described as "a quartz vein about 30 feet wide, lying in contact with granite and slate formation and carrying gold and silver that will aggregate about \$60 per ton. It is considered a magnificent property, and the success of the enterprise and the good fortune of the Helena parties taking hold of it is beyond doubt. The property is comparatively undeveloped, having but a 50-foot shaft and several hundred feet of tunneling, performed by the discoverer, but the ledge is of unmistakable firmness and continuation." Another new company is the Rapid Transit, gotten up by the same man, Mr. Wortrich, to work the mine that bears the same name and lying west of the Drumlunnon. The company consists of M. Sands, president; G. S. Cross, secretary, Mr. Wortrich and others.

SILVER CHAIN.—*Anaconda Review*, Dec. 24: During the past week the Silver Chain Company has reduced its force to seven men, who are employed principally on repairs and placing the mine in order for extensive improvements which are to be made at an early day. The main shaft has attained a depth of 110 feet. At this depth some very high-grade ore is being extracted. The 40-foot level has been run north 25 feet and south 60 feet, both following a regular vein of high-grade copper-silver ore. The ores extracted from these drifts have been shipped to Butte reduction works, the last carload of which gave returns of a little over 183 ounces per ton silver. The vein in the south drift shows an improvement in quantity and quality. The next carload it is expected will average 250 ounces silver per ton. On Tuesday a crosscut was started east in the north drift, penetrating what appeared to be the footwall. After driving a distance of two feet a vein of ore was cut which was found to be six feet wide, an average sample of which was brought to town and pronounced by competent judges to be 200-ounce ore. A crosscut was started in the south drift where the same vein was found, being in quantity and quality the same as found in the north crosscut. The discovery of this parallel vein is undoubtedly the most important find that has been made in this district since the discovery of the Blue-eyed Nellie, and places the Silver Chain, beyond a question of doubt, a full-fledged bonanza. The length of ground now opened is over 100 feet. The extreme limits of the ore chute have not yet been found, and at a depth of 110 feet not one pound of ore has yet been stowed. It is the intention of the lucky owners at an early day to erect a steam hoist of sufficient capacity to sink to a greater depth; also to place a diamond drill in the mine to be used in explorations.

NEW MEXICO.

VARIOUS MINES AND CAMPS.—*Socorro Bulletin*, Jan. 1: A cleanup of the Homestake mill, White Oaks, recently, was very satisfactory. White Oaks and her mines are attracting considerable attention in St. Louis, and deservedly so. The Homestake, of White Oaks, is just at this time making a remarkably good showing of gold ore. Charley Bell, the cattleman, has recently made several locations on rich copper ore in the North Oscuras. C. T. Brown last week made the discovery of a new body of very rich lead silver ore. The Silver Queen is a promising property. A. A. Franzheim has refused a heavy cash advance for his interest in the Georgia Belle, of Water canyon, which he purchased a month ago. Geo. Deeds came in from the southwestern part of the county last night, with splendid quartz permeated with gold, and left at once for Denver. He made the strike in this county. There is a strong probability that Eaton smelter in the Magdalena is to be converted into a concentrating plant, and greatly enlarged in its capacity. This is

a good move. The Ladrone district is now yielding high-grade silver ore. Jack Donovan came in from Fairview yesterday, and describes the camp as lively and the mining outlook good. He says that more money is made at Hermosa by poor men than in any other camp in the Southwest. The Copper King in the Ladrone district has a 50-foot shaft in which excellent gold and silver mineral decorates the full width, assaying 10 to 15 ozs. in silver, \$30 to \$48 in gold, and 18 per cent copper. The field in which, in a previous issue, we reported the discovery of cinnabar, is now being energetically prospected, and before the week closes this office will have the particulars. In case the mineral is sufficiently abundant the capital has already been raised to erect a plant in this city to convert the sulphide into metallic mercury. Mike Wallace's strike in the Georgia Belle, in Water canyon, has without doubt thrown open to view the largest body of argentiferous galena ever opened up in this county. Work on the property continues without interruption. The mines in the district are commencing to attract attention from capital. The Las Vegas & St. Louis M. and S. Co. has completed its assessments for the year 1886. This company has a number of the most valuable properties in the country, distributed among several districts. It is the oldest mining corporation in the county, and one of the oldest in the Territory. Gustav Billing, of Socorro, has leased the Last Chance mine, owned by Head & Hearst, in the Victorio district, and will soon put on a large force of workmen.

OREGON.

PLACER AND QUARTZ.—*Jacksonville Times*, Dec. 31: Much placer mining is going on in Josephine county at the present time. Legg & McDonald, of Forest creek, have no full supply of water, but have done some work already. A correspondent says that the miners in the vicinity of Woodville have an abundance of water and are busy. Ingram & Baker, of Willow Springs, have enough water to finish cleaning up some ground left over from last season. The Sterling Mining Co. has been operating one pipe for several days past and will soon have enough water to start the other. Owing to the bad condition of the roads no quartz can be hauled to Klippel, Baunle & Co.'s mill, and it is therefore lying idle. J. S. Grigsby and others, who discovered a promising placer mine in the vicinity of Table Rock, are preparing to work it this season. Smith & Lyoch are operating their placer mines in the Wagner creek district and making good progress with a fair supply of water. There has been considerable rain during the week, but not quite enough yet for mining purposes. Some work is being done in many places, however. Hatch & Rieve are still prospecting their ledge in Jackson creek district, from which very promising quartz is being taken. It is reported that the mine is bonded. A. W. Sturgis is having a large quantity of pipe made at K. Kubli's hardware store, which will enable him to make a big showing at his mine on Forest creek this season. Several new hydraulic mines will be operated this season, the old method of ground-sluicing being found too slow for expeditious mining for our short winter season. Dean & Huston have put a long string of new hydraulic pipe and a giant on their mines in Willow Springs district, and will make a more extensive run than ever before. Grod & Brandel are engaged in taking quartz out of their mine on Jackson creek. They were well pleased with the result of the run made on their ore by Klippel, Baunle & Co.'s mill, Simmons, Ennis & Co.'s mammoth placer mine in Waldo district, Josephine county, is being opened at a rapid rate at present and will be ready for scientific mining operations next season.

MINERS HAPPY.—*Oregon Sentinel*, Jan. 1: Rain has been falling off and on during the past week, which has so increased the water as to allow the Ankeoy, Gin Lin and other hydraulic mines to be worked with a full head of water. The large amount of snow on the mountains is believed to be sufficient to insure plenty of water during the mining season. On Tuesday last, Applegate river was so high that it could not be forced.

MINING COMPANY DISSOLVED.—*Oregonian*, Jan. 1: The company consisting of Gen. J. C. Tolman, E. P. Torrey, E. C. McKercher and others, who put up a quartz mill in the Pine creek district, has been dissolved. It appears that the machinery put in would not save the gold, and Mr. Tolman became discouraged and withdrew to his farm in Southern Oregon. The whole concern has now passed into the hands of McKercher. Mr. Torrey feels confident that with the addition of some pans he has procured from Rye valley he can save the gold, and he has leased the mill for six months and will give the work another trial.

UTAH.

REVIEW.—*Salt Lake Tribune*, Dec. 31: The receipts in this city for the week ending December 29th, inclusive, were \$135,530.83, of which \$112,353.07 was bullion and \$23,177.76 was ore. For the previous week the receipts were \$99,180.19, of which \$26,357.53 was ore and \$72,822.66 was bullion. The Ontario product for the week was 20,199 fine ounces, and ore sales amounting to \$8301.97, a total of \$28,500.97 in value. The Ontario closes the year with the usual monthly dividend of 50 cents a share, making \$6 a share for the year, or \$900,000 in aggregate. This is the 127th dividend from the beginning, or a total \$9,525,000 in dividends, and never an assessment. The Daly output for the week was six bars of bullion, 8601.08 fine ounces, and sale of lot No. 77 of ore \$7033.74, a total value of \$15,634.82. Fine bar receipts for the week were to the value of \$37,107.13; base bullion \$15,900. The Stormont sent up on the 23d silver bars to the value of \$2760. The product of the Hanauer smelter for the week was bullion to the value of \$18,260. T. R. Jones & Co. report selected lead received to the value of \$7239.52. Alice bars, 31, amounting to \$21,866.42 were received during the week. Ore receipts for the week include \$10,000 by Wells, Fargo & Co.; \$8700 Queen of the Hills by McCormick & Co.; and \$4477.76 by T. R. Jones & Co.

ORE.—*Park Record*, Dec. 26: Ore shipments were resumed this week and will likely continue on a large scale, while sleighing is good. The Sampson has levied another assessment of 25 cents per share, payable before January 31, 1887. The third Anchor pump is nearly ready for action on the lowest level, and in a few days sinking will be again commenced.

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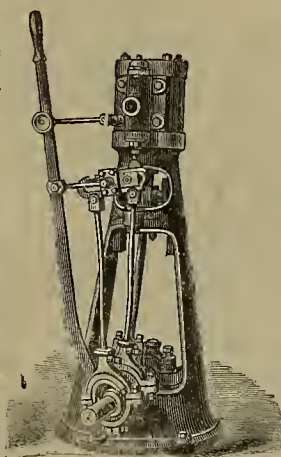
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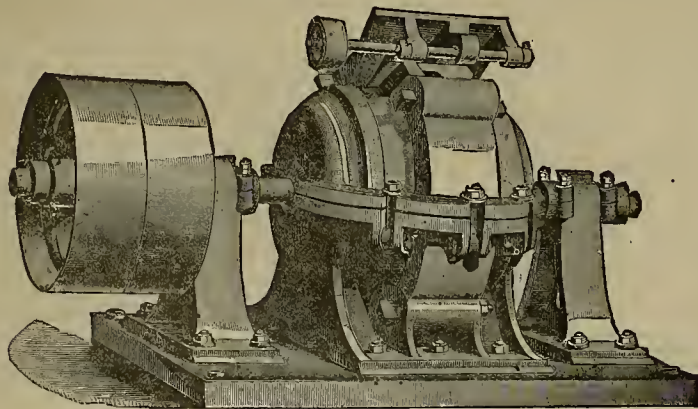
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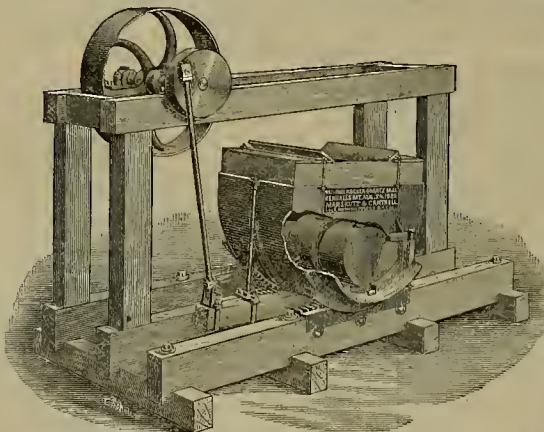
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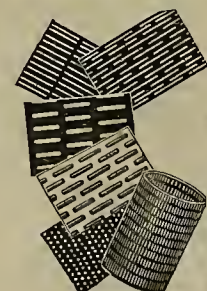
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Mines Examined and Reported on.
Practical Instruction given Treating Gres by improved processes.

G. KUSTEL & CO.,
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Will attend to business in connection with mines in Sonora or Arizona.

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20 Samples for trial, post-paid, 10 Cents.
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JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

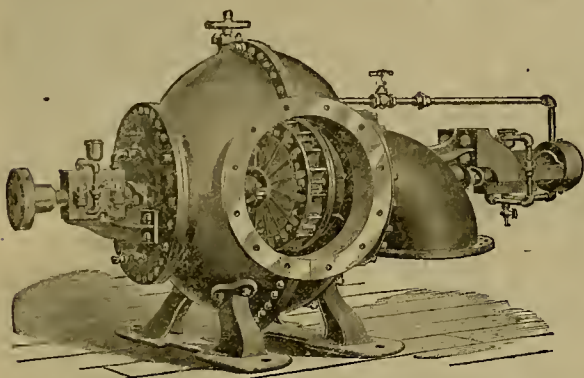
Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

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Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

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GIANT POWDER or DYNAMITE,
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

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FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

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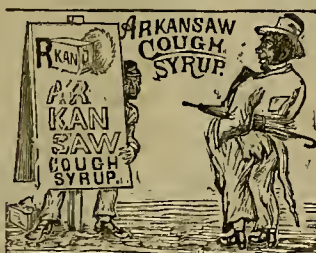
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COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

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Do you want a sure, safe and reliable Cough Syrup? Are you troubled with a Cough, Cold, Bronchitis or Lung Complaint? Do your Babies keep you awake all night with Hacking Coughs, Colds in the Head, etc. Do you want something reliable in the house to meet these emergencies? We answer to all: "Go to your Druggist and get a Bottle of the Arkansas Cough Syrup, and be troubled no more." Price, 50 cents per Bottle!

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1858.

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Native Platinum and Scrap purchased.

PLATINUM

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 262 Market St., S. F.

FOR WEEK ENDING DECEMBER 28, 1886.

- 355,114.—ELEVATOR—Henry Albart, Crescent City, Cal.
- 355,126.—ARTIFICIAL TOOTH—C. E. Blake, Sr., S. F.
- 355,251.—HYDRAULIC DREDGER—A. B. Bowers, S. F.
- 355,132.—ADJUSTABLE NAME-PLATE—Brown & Roller, S. F.
- 355,061.—WASHING MACHINE—Sabina W. Cook, Dayton, W. T.
- 355,143.—GAS STOVE—C. A. Cushing, S. F.
- 354,895.—BABY-WALKER—Sarah E. Gleason, Tacoma, W. T.
- 355,163.—SEWER SYSTEM—C. E. Grunsky, Sacto.
- 354,899.—FORCE-BLAST CUPOLA—Mark Hamm, Stockton.
- 355,179.—BARK-CUTTER—R. C. Kirby, Santa Cruz, Cal.
- 355,094.—PNEUMATIC DREDGER—W. P. Lewis, Oroville, Cal.
- 354,923.—EXTRACTING NICKEL AND COBALT FROM ORES—D. Mindeloff, S. F.
- 355,097.—WATER ENGINE—P. F. Morey, Portland, Ogd.
- 355,268.—HEATING ATTACHMENT FOR STOVES—K. A. Rew, Pomeroy, W. I.
- 354,937.—SMOKE BONNET—W. Rose, Sacto.
- 355,227.—HINGE FOR BOXES, ETC.—J. V. Snyder, Santa Maria, Cal.
- 354,950.—FENCE-POST BASE—J. D. S. W. P. Titman, Yakima, W. T.
- 17, 42.—DESIGN—F. M. Gilham, S. F.

Notes.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

HINGE FOR BOXES OR TRUNKS.—J. V. Snyder, Santa Maria, Santa Barbara Co. No. 355,227. Dated Dec. 28, 1886. This is a cheap and easily applied hinge for trunks and such boxes as are used for hutter. The hinge is a rigid piece or strip bent at right angles like a hell-crack lever, and is so arranged as to work readily, and is not easily broken or torn off.

GAS STOVE.—Chas. A. Cushing, S. F. No. 355,143. Dated Dec. 28, 1886. This is a gas stove such as is used for heating purposes. It is provided with water pipes by which water may be heated. The construction is such that cooking may be carried on. The stove is so arranged as to have the very desirable attachment of a water-hack where a sufficient quantity of hot water may be had at all times without in any way interfering with the other processes of cooking.

ARTIFICIAL TEETH.—Chas. E. Blake, Sr., S. F. No. 355,126. Dated Dec. 28, 1886. This invention relates to metal crowns (including the masticating surfaces) with porcelain faces; and it consists in having the thin metal crown perforated upon its labial surface and a thin enamel backed thereon. The crown, which is preferably formed of platinum, is made to fit the root or any remaining portion of the tooth, being built up therefrom, so as to have a proper shape and height, being in all respects when finished a complete tooth ready for service.

ELEVATOR.—Henry Albart, Crescent City, Del Norte Co., Cal. No. 355,114. Dated Dec. 28, 1886. This is one of the class of elevators provided with safety appliances. It consists in the construction and arrangement of the clutch mechanism, the brake mechanism, the safety hatch, and means for locking its sections; the huffers to receive the weight of the cage or car upon the closed hatch; the means for operating the various parts upon the breaking of the hoisting cable or rope, and various other details. The object is to provide effective safety appliances for elevator cages.

ADJUSTABLE INSCRIPTION FOR NAME-PLATES.—D. A. Brown and Josiah W. Roller, S. F. No. 355,132. Dated Dec. 28, 1886. This invention consists in a slotted plate and independent separate and movable chamber and ornament blocks provided with novel shanks or stems, whereby they are fitted to the plate and adjusted and secured in the slot. The object of the invention is to provide for the ready preparation of a plate or sign bearing any name or inscription, and it is designed to take the place of engraving on coffin and casket name-plates, metal signs, etc. This invention is a specially useful one for country and village undertakers and sign-makers.

BARK-CUTTER.—R. C. Kirby, Santa Cruz. No. 355,179. Dated Dec. 28, 1886. This machine is for cutting bark for tanners' use. It comprises, among other parts, a cutter-carrying wheel having a hub fixed upon the driving shaft, a central radial wheel and a broad rim, through which slots are made alternately upon opposite sides, cutters extending longitudinally through these slots, and a feed chute through

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.	
Chollar M Co.	Nevada.	22.	50. Nov 16.	Dec 21.	Jan 13. C. E. Elliott.	309 Montgomery St.	
Caledonia S M Co.	Nevada.	41.	15. Nov 16.	Dec 23.	Jan 19.	A. S. Groth.	414 California St.
Champion M Co.	California.	23.	10. Nov 23.	Jan 28.	J. Wetzel.	322 Montgomery St.	
Columbus M Co.	Nevada.	5.	50. Dec 22.	Jan 27.	Feb 18.	J. M. Buttington.	309 California St.
Dictator Con M Co.	Nevada.	1.	01. Dec 15.	Jan 22.	Feb 12.	J. F. Boller.	Hawthorne Nev.
Gori la M & M Co.	California.	4.	06. Nov 26.	Dec 31.	Jan 21.	A. A. Englund.	436 Montgomery St.
Golden Fleece G M Co.	California.	7.	10.00. Nov 22.	Dec 27.	Jan 15.	W. J. Gleason.	Fielden Block
Goconda M Co.	California.	2.	03. Dec 22.	Jan 27.	Feb 16.	J. M. Buttington.	309 California St.
Live Oak D G M Co.	California.	4.	10. Dec 7.	Jan 15.	Feb 5.	T. Wetzel.	522 Montgomery St.
Midex G & S M Co.	Nevada.	3.	25. Dec 16.	Jan 22.	Feb 10.	T. W. Nowlin.	320 Montgomery St.
Mayflower Gravel M Co.	California.	33.	23. Nov 19.	Dec 22.	Jan 17.	J. Morizio.	328 Montgomery St.
Mexican G & S M Co.	Nevada.	33.	25. Jan 4.	Feb 9.	Mar 2.	C. E. Elliot.	309 Montgomery St.
North Sierra Nevada M Co.	Nevada.	4.	20. Nov 26.	Jan 21.	Jan 24.	J. L. Fields.	330 Pine St.
Oreans Con M Co.	Nevada.	1.	05. Dec 6.	Jan 12.	Feb 2.	J. Stadfield Jr.	419 California St.
Phoenix Con M Co.	California.	1.	60. Dec 6.	Jan 10.	Jan 31.	C. O. Collishaw.	516 California St.
Peerless M Co.	Arizona.	9.	10. Nov 16.	Dec 23.	Jan 17.	A. Waterman.	309 Montgomery St.
Polar Star M Co.	New Mexico.	1.	07. Nov 17.	Dec 31.	Jan 15.	J. C. Stump.	339 Montgomery St.
Sierra Iron Co.	California.	6.	2. 60. Nov 18.	Dec 22.	Jan 18.	H. P. Bush.	431 California St.
Summit G M Co.	California.	9.	10. Nov 24.	Dec 29.	Jan 18.	G. W. Sessions.	339 Montgomery St.
Sierra Nevada S M Co.	Nevada.	87.	25. Jan 4.	Feb 9.	Mar 1.	E. L. Parker.	309 Montgomery St.
Utah S M Co.	Nevada.	54.	50. Nov 20.	Dec 27.	Jan 19.	H. Fish.	309 Montgomery St.
Yosemite Queen M Co.	California.	2.	02. Dec 4.	Jan 11.	Feb 1.	H. C. De Landresse.	628 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Alaska M & M Co.	Nevada.	E. F. Stone.	306 Pine St.	Annual.	Jan 12
Bullion M Co.	Nevada.	R. R. Grayson.	327 Pine St.	Annual.	Jan 13
Gila G & S M Co.	Arizona.	A. W. Grayson.	328 Montgomery St.	Annual.	Jan 17
Idaho G & S M Co.	Idaho.	F. W. Sumner.	328 Montgomery St.	Annual.	Jan 10
Silver King M Co.	Nevada.	J. Nash.	328 Montgomery St.	Annual.	Jan 11
Sulphur Bank Q S M Co.	California.	T. Wintringham.	306 California St.	Annual.	Jan 17

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Martin White M Co.	Nevada.	J. J. Scoville.	309 Montgomery St.	25.	Dec 20
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	10.	Nov 30
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Dec 15

which the hark is introduced and brought into contact with the rim and the centers, said chutes having an interior adjustable portion which may be set up so as to regulate the fineness to which the hark is to be cut.

SEWER SYSTEM.—Chas. E. Grunsky, Sacramento. No. 355,163. Dated Dec. 28, 1886.

This improved sewer system consists in pipes or mains graded to the amount of sewage, and sufficiently small to insure velocities that will prevent deposits; self-discharging receivers connected with the closets, basins, sinks, etc., and located at varying heights above the mains, and singly or in groups, the members of which have the same elevation; pipes connecting the receivers with the mains, whereby the contents will enter the mains under considerable pressure; the check valves or gates in the mains whereby water may be introduced and hauled up into any given receiver or group of receivers to cause them to act simultaneously, and thereby to flush the whole system. The object of this invention is to provide a sewer system which shall be effective under all circumstances, and which will permit the pipes or mains to be laid independent of grade.

Mining Share Market.

There is still more or less activity in the mining share market, although prices are by no means up to the figures of a few weeks since. The favorite stocks have been Hale and Norcross and Chollar. The promised dividends of Con. California and Virginia have not come yet. Still the mine had assets on the 1st inst. of \$453,300, and the last week's bullion shipments and cleanup for the month to be added. Potosi and Savage are said to be looking well. The following companies report cash on hand January 1st: Alpha, \$8892; Alta, \$26,646; Andes, \$6294; Benton, \$5544; Bodie, \$13,281; Best and Belcher, \$25,442; Belle Isle, \$1982; Belcher, \$2865; Bullion, \$6277; Bulwer, \$19,267; Con. California and Virginia, \$453,300; Chollar, \$47,420; Crockett, \$5737; Crown Point, \$24,059; Exchequer, \$20,299; Gould and Curry, \$14,280; Head Center, \$1363; Hale and Norcross, \$3563; Independence, \$8977; Martin White, \$6503; Mexican, \$2221; Mono, \$29,000; Manhattan, \$5462; Navajo, \$2417; N. B. Isle, \$256; Occidental, \$4414; Ophir, \$5085; Potosi, \$21,135; Peer, \$7493; Peerless, \$11,686; Sierra Nevada, \$4670; Scorpion, \$9044; Standard, \$15,297; Tranquility, \$8203; Utah, \$5544; Union Con., \$15,769. Con. Cal. and Virginia had \$192,657 cash and \$266,613 bullion on hand and in transit.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Bluebird, Dec. 28, \$19,200; Silver Bow, 28, \$29,044; Eureka Con., \$1,104.91; Hanauer, 28, \$38,960; Queen of the Hills, 28, \$420; Bannock, 28, \$1820; Alice, 28, \$12,824; Queen of the Hills, 29, \$2830; Hanauer, 30, \$2150; Bannock, 30, \$3850; Queen of the Hills, 31, \$2200; Hanauer, 31, \$2070; Stormont, Jan. 1, \$3310; Queen of the Hills, 1, \$2300; Hanauer, 1, \$9350; Con. Virginia and California, 1, \$86,404. The banks of Salt Lake City report the receipt for the week ending Dec. 31st, of \$12,353.07 in bullion, and \$23,777.76 in ore; a total of \$36,130.83. The metal shipments out from this city for the week ending Jan. 1st, inclusive, were 19 cars of bullion, 542,610 pounds; nine cars lead ore, 192,429 pounds; 20 cars silver ore, 613,800 pounds; three cars copper ore, 92,900 pounds; total, 51 cars, 1,447,739.

THE CELLULOSE PATENTS.—The Commissioner of Patents has rendered a decision in the important case of the Cellulose Manufacturing Company, of Adams, Mass., which is said to involve millions of dollars. This company obtained letters patent for the manufacture of artificial ivory and had engaged extensively in this work when the Newark Company set up a claim for this invention. This began in February, 1884, and was concluded last week by the decision of Commissioner of Patents Montgomery, who holds that the Newark Company had no right to the invention and directs the rejection of their application.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 16.	WEEK ENDING Dec. 23.	WEEK ENDING Dec. 30.	WEEK ENDING Jan. 6.
Alpha.	4.00	8.00	2.25	3.00
Alta.	1.50	5.00	1.00	1.50
Andes.	1.00	3.00	1.00	1.50
Argenta.	.25	.75	.15	.25
Belcher.	.325	7.75	3.00	3.50
Brophy.	1.10	1.30	1.25	1.00
Bullion.	1.00	1.30	1.25	1.00
Bulwer.	1.40	2.25	1.00	1.25
Bodie.	.75	1.25	1.10	1.25
Bodie Tunnel.	.100	1.00	1.05	1.00
Bulwer.	1.60	2.25	1.50	1.30
Con. Va. & Cal.	.27	.52	.23	.16
Chollar.	1.90	5.00	1.50	2.00
Confidence.	.90	1.50	1.10	1.75
Con. Imperial.	1.40	2.00	1.70	2.00
Caledonia.	1.00	1.35	1.10	1.25
Con. Pacific.	.40	.55	.35	.25
Crown Point.	4.00	9.25	6.00	5.50
Crocker.	.90	1.30	1.60	1.90
Central.	.50	1.80	.55	.60
Dudley.	1.00	1.40	1.10	1.25
East B. B.	1.75	2.20	2.25	2.00
Eureka Con.	4.40	9.00	4.40	4.50
Exchequer.	1.00	3.10	1.25	1.70
Grand Prize.	3.00	11.25	5.25	4.00
Gould & Curry.	3.00	11.25	5.25	4.00
Hale & Norcross.	3.60	9.25	4.00	3.30
Holmes.	3.00	4.00	3.00	2.75
Independence.	.35	.45	.25	.25
Iowa.	1.25	2.00	1.25	1.70
Justice.	1.90	3.60	1.50	2.60
Kentuck.	.25	2.60	2.00	1.80
Lady Wash.	1.00	1.35	1.50	1.00
Martin White.	2.75	4.00	2.50	3.00
Mono.	2.75	4.00	2.50	3.00
Mexican.	4.25	13.40	8.25	5.75
Mt. Diablo.	3.50	3.60	3.75	3.50
Northern Belle.	.80	1.75	1.00	.90
Navajo.	4.25	7.75	3.50	3.25
North Belle Isle.	4.25	7.75	3.50	3.25
Nias.	.45	.65	.65	.65
Neve. Queen.	1.90	3.00	1.40	1.70
North G. & C.	1.50	2.25	1.00	1.25
Occidental.	3.00	8.10	4.00	3.75
Ophir.	8.00	31.10	13.75	11.10
Overman.	1.00	4.00	1.00	1.75
Potosi.	.25	1.00	1.00	.50
Peerless.	.25	1.90	.80	.65
Peer.	.40	1.80	.30	.45
P. S. Silver.	.60	.65	.65	.65
Silver Star.	.60	.65	.65	.65
Savage.	7.00	13.80	12.50	8.75
Seg. Belcher.	3.60	9.25	4.00	3.30
Sierra Nevada.	8.00	7.10	8.00	4.70
Silver Hill.	.50	1.60	.35	.70
Silver King.	.45	2.75	.80	1.45
Scorpion.	.25	.35	.20	.35
Syndicate.	2.00	9.00	2.50	3.80
Union Con.	3.00	9.25	7.00	5.25
Utah.	4.90	8.00	7.00	6.00
Yellow Jacket.	4.90	8.00	7.00	6.00

Sales at San Francisco Stock Exchange.

THURSDAY Jan. 6, 1887.	935	Hale & Nor.	99
730 Alta.	3.60	3.70	100
7-0 Andes.	1.75	1.80	100
1225 B. & Belcher.	124	125	20
1350 Bullion.	3.80	4.00	240
480 Bodie Con.	3.00	3.05	225
1540 Benton Con.	1.10	1.15	300
425 Belcher.	5.00	5.05	100
150 Bulwer.	1.50	1.55	100
200 Bunker.	1.50	1.55	790
1100 Belle Isle.	5.00	5.05	650
200 Central.	5.00	5.05	650
1350 Chollar.	12.00	12.05	100
200 Con. Va. & Cal.	2.25	2.30	120
350 Crown Point.	4.00	4.05	350
100 Crocker.	1.40	1.45	140
100 Confidence.	9.00	9.05	850
100 Challenge.	2.40	2.45	100
1250 Caledonia.	9.00	9.05	100
455 Exchequer.	2.50	2.55	300
455 Eureka Con.	4.75	4.80	250
415 Gould & Curry.	7.00	7.05	250

Easy Binder.

Dewey's patent elastic binder, for periodicals, music and other printed sheets, is the handiest, best and cheapest of all economical and practical file binders. Newspapers are quickly placed in it and held neatly, as in a cloth-bound book. It is durable and so simple a child can use it. Price, size of Mining and Scientific Press, Rural Press, Watchman, Fraternal Record, Masonic Record, Harper's Weekly, and Scientific American, 75 cents; postage, 10 cents. Postpaid to subscribers of this paper, 50 cents. Send for illustrated circular. Agents wanted.

BACK FILES OF THE MINING AND SCIENTIFIC PRESS (unbound) can be had for \$3 per volume of six months. Per year (two volumes) \$6. Inserted in Dewey's patent binder, 60 cents additional per volume.

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Jan. 6, 1888.

ANTHONY—French Star.	21	@	8
BORAX—San Bernardino.	—	@	8
Amargosa.	—	@	8
IRON—Glengarnock ton.	—	@	23
Edgerton ton.	—	@	23
American Sulf., No. 1, ton.	24	@	60
Oregon Pig, ton.	21	@	60
Clippage, Nos. 1 & 4.	22	@	60
Shay Lane White.	21	@	60
Shotta, No. 1.	23	@	60
COPPER—			
Bolt.	25	@	—
Sheeting.	18	@	23
Ingot.	12	@	13
LEAD—Pig.	4	@	50
Bar.	5	@	50
Sheet.	8	@	—
Shot, discount 10% on 500 bag.	1	@	65
Buck, 3/4 bag.	1	@	65
Child, 40.	2	@	65
ZINC—German.	2	@	9
Sheet, 7x3 ft., 7 to 10 lb., less the cask.	61	@	—
QUICKSILVER—By the tank.	36	@	39
Flasks, new.	1	@	05
Flasks, old.	85	@	—

New York Metal Market.

Telegraphic advices dated Jan. 6th give the following New York prices:

BAR SILVER—\$1.00 1/2 per oz.
BORAX—5 1/2 @ 5 3/4 c.
COPPER—LAKE—\$11 1/4 @ \$11 1/2.
IRON—No. 1, \$18.50 @ 19.50.
LEAD—\$4.85 @ 4.95.
QUICKSILVER—52 1/2 @ 53 c.
The following is the latest by mail from the "New York Metal Exchange Market Report":
COPPER—Dull, spot closing at 18.00 @ —
Transferable Notices (Lake) issued at 11.80.
Transferable Notices (Chili Bars) issued at 13.80.
LEAD—Quiet and steady at 4.20 @ 4.40 spot.
Transferable Notices issued at 4.33.
TIN—Quiet at 22.20 @ 22.33. Transferable Notices issued at 22.20.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.00 @ 22.25; Billiton Tin, \$22.75 @ 23.10; Banca Tin, \$22.75 @ 23.50; Baltimore Copper, \$10.75 @ 11.00; Orford Copper, \$10.75 @ 11.00; P. S. C. Copper, \$10.50 @ 11.00; Foreign Lead, \$4.40 @ 4.80; Foreign Spelter, 4.35 @ 4.75.
MAKERS' PRICES

Inducements to Subscribers.

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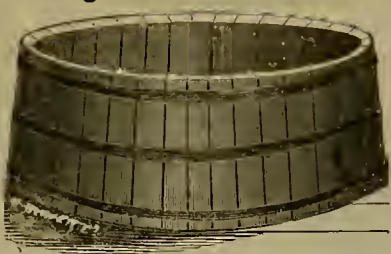
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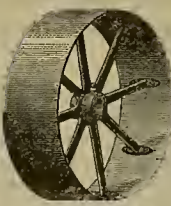
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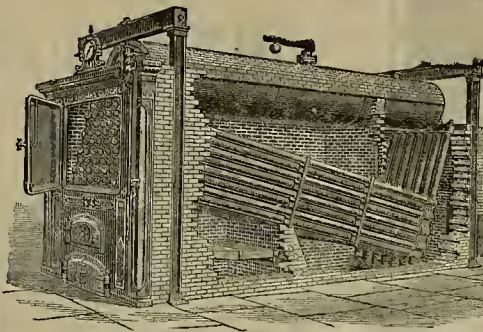
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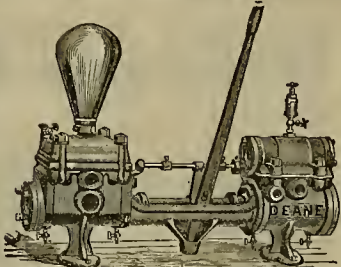
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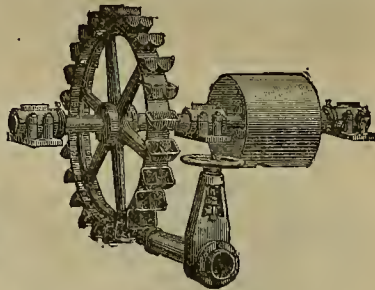
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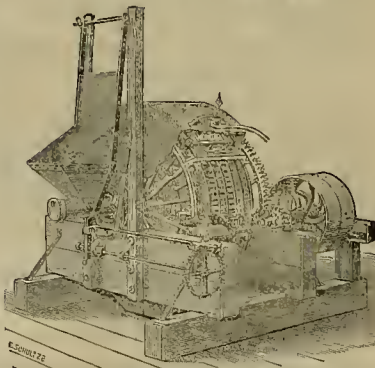
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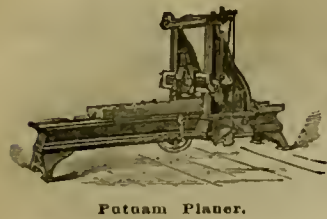
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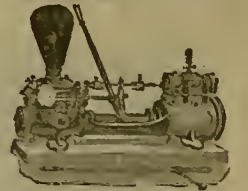
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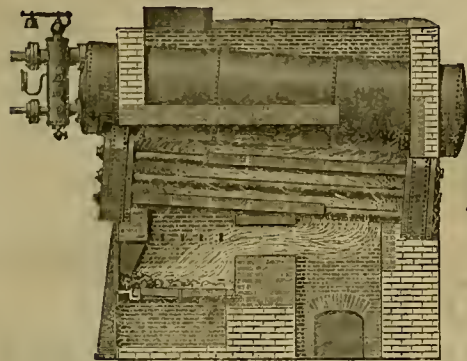
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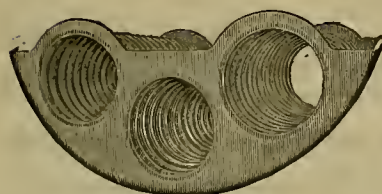
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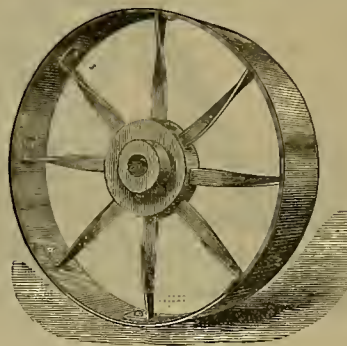
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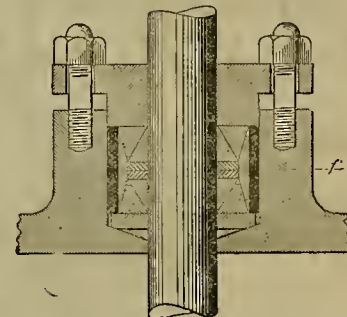
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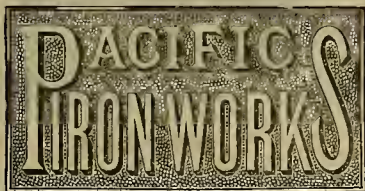
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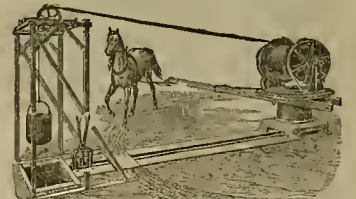
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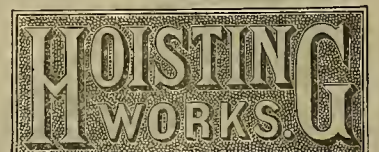
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This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE BEING sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.

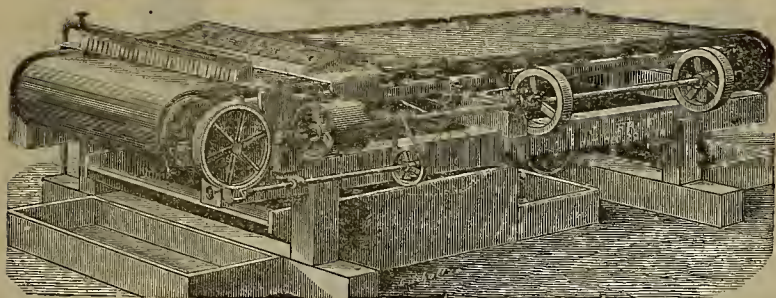


BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, and weighs OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700-pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE of CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



\$1,000 CHALLENGE!



PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS (\$575.00) F. O. B.

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph) we have satisfied ourselves of the superiority of your Vanner, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

ADAMS & CARTER.

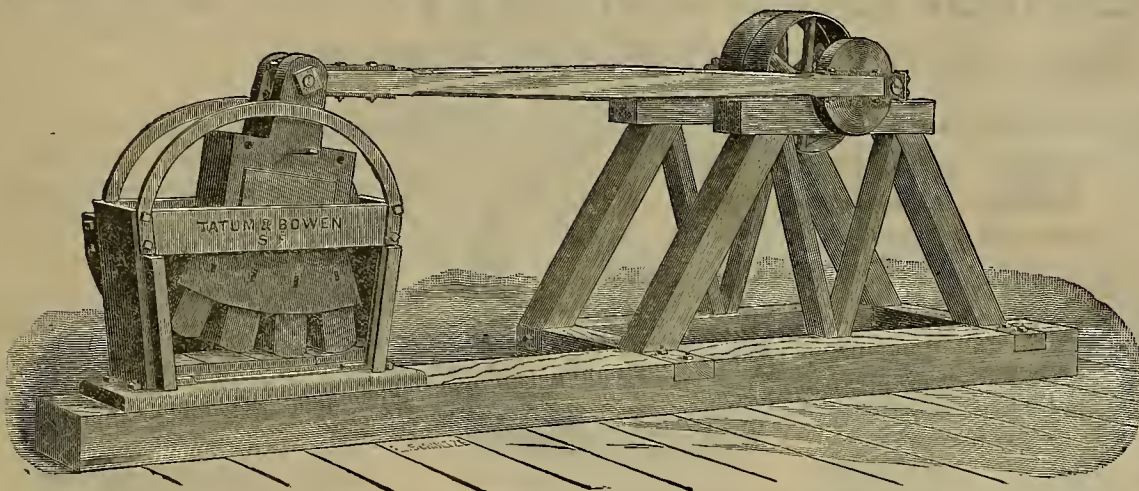
Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883, September 18, 1883. Patents applied for.

**THE FRUE ORE CONCENTRATOR
OR VANNING MACHINE.**

**ADAMS & CARTER, Agents Frue Vanning Machine Co.,
Room 7, No. 109 California Street, SAN FRANCISCO, CAL.**

JAMES' PATENT RECIPROCATING STAMP MILL.

(PATENTED AUG. 16, 1881.)



Weight of Boes and Shoes (1200 pounds) acts on each Shoe separately. It is practically the same as the regular Stamp Mill.

Capacity, 6 Tons in 24 Hours. 4 H. P.

Parties wishing to test the Mill with any ore they may bring, will find one in operation at our works in this city.

PRICES:

Reciprocating Stamp Mill,	\$350 00
Rock Breaker, - - -	100 00
Automatic Ore Feeder, -	50 00
Single Track Ore Car, -	40 00

SEND FOR CIRCULAR.

TATUM & BOWEN,

34 & 36 Fremont St., San Francisco.

91 & 93 Front St., Portland, Oregon



SEND FOR CIRCULAR.

IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

BEST SOFT LAKE SUPERIOR COPPER USED.

3000 Orders filled. Reference first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.

E. G. DENNISTON, Proprietor.

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

F. A. HUNTINGTON,

MANUFACTURER OF

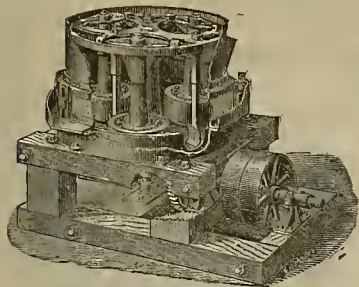
**Centrifugal Roller Quartz Mills,
CONCENTRATORS AND ORE CRUSHERS,**

Mining Machinery of Every Description,

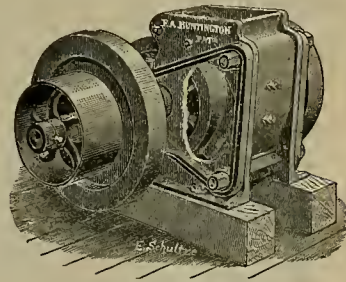
Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



Centrifugal Roller Quartz Mill.



ORE CRUSHER.



NOTICE TO GOLD MINERS! SILVER-PLATED AMALGAMATED PLATES For SAVING GOLD!

IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER

FULL WEIGHT OF SILVER AND BEST QUALITY OF WORK GUARANTEED.

GET OUR PRICES BEFORE ORDERING ELSEWHERE. SAMPLES FURNISHED ON APPLICATION.

**SAN FRANCISCO NOVELTY AND PLATING WORKS,
No. 108 FIRST STREET.**

NOTICE.—All our plates are guaranteed to have the full weight of silver agreed upon, and are tested before leaving our works, thereby avoiding the complaints about light weight, made so often before we started in this branch of industry.

**JUSTINIAN CAIRE, Agent,
521 & 523 Market St., San Francisco,**

—DEALER IN—

Assayers' and Mining Material.

—MANUFACTURER OF—

BATTERY SCREENS AND WIRE CLOTH.

Agent for **HOSKINS'**
HYDRO-CARBON ASSAY FURNACES,

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JANUARY 15, 1887.

VOLUME LIV
Number 3.

James Lick.

At Rest in the Pier of the Great Telescope.

On Oct. 1, 1876, more than a decade ago, James Lick, the philanthropist, died in San Francisco, and was temporarily entombed in the Masonic cemetery. Since that time the various benefactions provided for in his will have been carried forward, and the greatest of them all, the Lick Observatory at Mt. Hamilton near San Jose, is very near completion. According to an arrangement made before Mr. Lick's death, Mt. Hamilton was selected as the permanent resting-place for his remains. This was not by his direction, and it must not be thought that he had any vain idea of securing a lasting monument for himself in his establishment of the Observatory. It was thought fitting by his friends that his tomb should be the solid pier of masonry upon which will rest the magnificent telescope which he has given to the people of this State—the greatest telescope the world has thus far seen. Last week the remains of Mr. Lick were removed from San Francisco to Mt. Hamilton and are now safely inclosed as was planned 10 years ago. The final burial was conducted with simple ceremonies, as will be described.

The remains were taken from San Francisco to San Jose by rail on Saturday, January 8th, with an escort of gentlemen representing the various institutions which have been intrusted with the management of Mr. Lick's benefactions. San Jose was reached at 11 A. M., a procession of citizens of San Jose followed the remains to the borders of the city, and thence to the mountain the body was accompanied by those who went from this city and by the Mayor of San Jose. The mountain-top was reached at about 5 o'clock P. M., and the party proceeded at once to the rotunda, where the casket was opened and the remains identified by Capt. Fraser and others. They then proceeded to the library, where Prof. Davidson read the memorial document of identification as follows:

This is the body of JAMES LICK, who was born in Fredericksburg, Penn., August 25, 1795, and who died in San Francisco, Cal., October 1, 1876.

It has been identified by us and in our presence has been sealed up and deposited in this foundation pier of the great equatorial telescope this ninth day of January, 1887.

In the year 1875 he executed a deed of trust of his entire estate, by which he provided for the comfort and culture of the citizens of California, for the advancement of Handcraft and Redecraft among the youth of San Francisco and of the State; for the development of scientific research and the diffusion of knowledge among men, and for founding in the State of California an astronomical observatory to surpass all others existing in the world at this epoch.

This observatory has been erected by the trustees of his estate, and has been named the Lick Astronomical Department of the University of California, in memory of the founder.

This refracting telescope is the largest which has ever been constructed, and the astronomers who have tested it declare that its performance surpasses that of all other telescopes.

The two disks of glass for the objective were cast by Ch. Feil, of France, and were brought to a true figure by Alvan Clark & Sons, of Massachusetts. Their diameter is 36 inches, and their focal length is 56 feet 2 inches.

Upon the completion of this structure the Regents of the University of California became the trustees of this Astronomical Observatory.

The Board of Trustees of the Lick estate:
RICHARD S. FLOYD, President.
E. B. MASTICK.
CHAS. M. PLUM.
GEORGE SCHONEWALD.

The President of the Board of Regents of the University of California and Governor of the State of California,

WASHINGTON BARTLETT,
(by J. W. Wilkins.)

The President of the University of California and Director of the Observatory.

EDWARD SINGLETON HOLDEN.
The President of the California Academy of Sciences and of the council thereof.

GEORGE DAVIDSON.
The President of the Board of Trustees of the California Academy of Sciences.

GEORGE E. GRAY.
The President of the Society of California Pioneers.

GUSTAVE REIS.
A Director and ex-president of the Society of California Pioneers.

PETER DEAN.
The Mayor of the City of San Jose.

C. W. BREYFOGLE.
The preparation of the above document was assigned to Professor George Davidson. It was approved and then engrossed in hand-

president of the Lick Trustees, Captain R. S. Floyd, in the following words: "Gentlemen: We are here to place the remains of James Lick in their final resting-place beneath this stone foundation of the pier upon which will be mounted the great telescope that he has given to California and the world of science.

"Mr. Lick left no positive instructions as to the disposition of his remains. The idea of making this place a tomb for his body did not enter the motive of his munificent bequest which has created this great work. The idea was suggested to him long after he made his trust deed, and it met with his approval.

about 25 tons and will be about 30 feet high. The mounting of the telescope, the tube and everything connected with it, will weigh 10 tons more.

Sketches from photographs taken at the Observatory are given on this page. It is probably generally known that, upon its completion, the Lick Observatory will become the Lick Astronomical Department of the University of California. The lenses for the great refracting telescope were safely brought across the continent and are now in the safe at Mt. Hamilton; the great iron dome which will house the instrument is approaching completion in this city; the other portions needed for the erection of the telescope are well in hand by different expert manufacturers, and during the coming summer the Observatory will be placed in the hands of the Regents of the University.

Mohave Mines, Arizona.

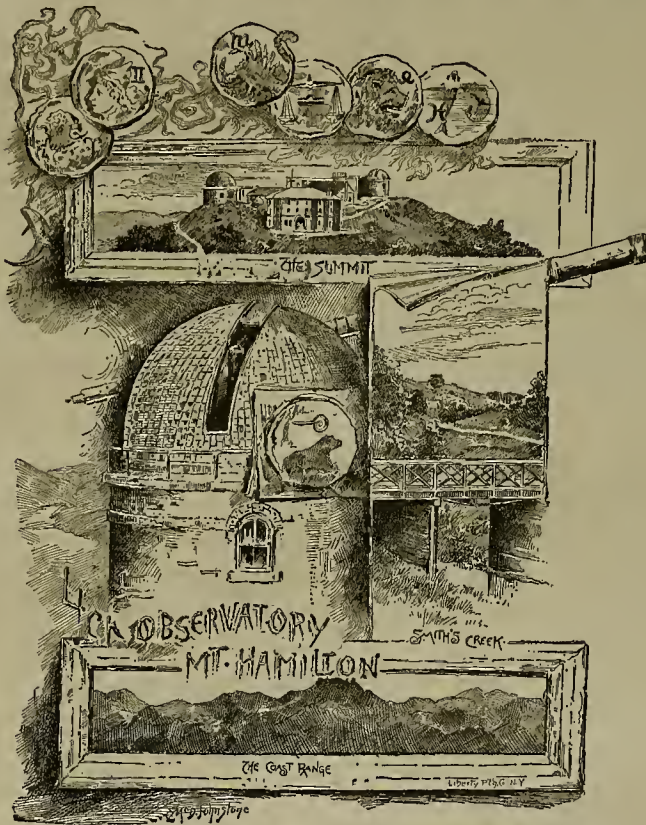
In the MINING AND SCIENTIFIC PRESS of Nov. 13th we gave an account of a valuable discovery in the Chimahueva range of mountains in Mohave county, Arizona, of a rich ledge containing gold and silver ore. Active work has opened the ledge 1265 feet from the highest point on the vein. Specimens taken from the bottom of the shaft, and assayed by ex-State Mineralogist Henry G. Hanks, gave a result of \$24 in silver and \$190 in gold. This mine has been named the Lion, and we are informed that recent developments show that on each side of the main ledge, about 20 feet therefrom, are parallel veins which assay almost the same amount in gold and silver as the main lode. Such a development is quite unusual in this section. This desolate region has remained undeveloped on account of scarcity of water and the presence of Indians. The promoters of this enterprise have secured an abundance of water close to the ledge, and are making preparations to erect a mill. Mining men and capital have been attracted to this section, and a high offer has been made for the Lion and refused. Active prospecting is being done in this locality, which may verify what has been prophesied, that this univerting range of mountains is full of rich mineral-bearing ledges.

UNIVERSITY STUDENTS AT THE WIRE WORKS.

The senior class in the College of Mechanic Arts of the University, accompanied by Mr. J. A. Sladky, foreman of the University shops, recently visited the California Wire Works in this city and passed several hours in a close examination of the machinery and processes there employed. Regent A. S. Hallidie, of the University, and proprietor of the works, personally explained the various features of the establishment and gave the young men a practical lecture which will be of much advantage to them.

The following is an estimate of the average fineness of *Cœur d'Alene* placer gold in thousands: Prichard creek, 780 to 830; Trail creek, 860 to 881; Old Wash, 950—the finest average of any district in the Territory. Clear creek, near Oro Fino, varies between 869 and 952.

It is claimed that gold has been found on the ranch of Thos. Kell, three miles from San Jose, on the Almaden road. The ranch has been leased and men are at work sinking a shaft on the claim.



THE LICK OBSERVATORY ON MOUNT HAMILTON.

some style with India ink on fine parchment. A notable feature of the document is the use of the words "handcraft" and "redcraft," being the old English terms for technical education. The words are certainly most appropriate, although long since fallen into disuse and not being found in the latest dictionaries.

After the signatures given above were affixed, the document of identification was inclosed between two finely tanned skins, hacked by black silk and soldered in a leaden box 18 inches long and of the same width and one inch in thickness. It was placed upon the iron casket, after which the lining of the oaken casket was soldered up air-tight and the oak lid screwed down. The casket was then draped with an American flag, and it was left in charge of a watchman until the following morning.

On Sunday morning at 11 o'clock the gentlemen who had escorted the body to Mt. Hamilton ascended the gang-plank leading to the foundation-stone, and, arranging themselves around the vault, now containing the casket, with ungoverned heads, were addressed by the

"The trustees have concluded, with the approbation of his son, John H. Lick, now in Pennsylvania, to place his remains in this pier, believing that the most powerful telescope so far made in the world will make his most appropriate monument, and this commanding site overlooking his California home his most fitting resting-place."

At the conclusion of the president's remarks, workmen placed strong iron bars upon the abutments of the vault, upon which was placed heavy iron sheeting. The vault was then built with brick and mortar to the level of the foundation-stone.

A great stone weighing two and one-half tons was then swung, being already suspended for the purpose, and let slowly down upon the brickwork, beneath which was the casket. Three other stones of the same weight were then placed in position, when the four were bolted by suitable bolts, running down to the foundation five feet. On top of the stones will be set the first section of the iron pier of the great telescope. The iron pier itself will weigh

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Remains of Mastodons.

EDITORS PRESS:—Some years since the London Philosophical Society sent a committee of investigation to the Siberian coast, in the Arctic regions, for the purpose of deciding a question then being discussed by scientists concerning the remains of the mastodon found there so plentifully. That commission reported that in their opinion those animals never inhabited that coast, but that the remains now found there were of animals that had been carried from more southern regions by rivers which flow into the Arctic ocean. There is, in a recently published newspaper, an account of a Mr. Mercier, an Alaskan explorer, having found on the surface a glacier 850 miles from the mouth of the Yukon river, the remains of an "Antediluvian forest," six feet in thickness, and associated with it mastodon remains in such abundance that he collected about four tons of them where the glacier was being dissolved at the margin of a stream. He states that some of the tusks were 10 feet in length. Heretofore explorers have frequently given descriptions of mastodon remains and extensive beds of timber found in the Arctic regions, but this is the first instance within my knowledge of such finding on the surface of a glacier. Such an occurrence as this cannot rationally be explained by any generally accepted theory relating to such matters. It proves conclusively, in connection with other facts, that the remains of tropical animals and extensive deposits of timber, now found in the Arctic regions, have been carried there by the waters at the time of a universal deluge. By such an hypothesis, a clear explanation may be given of this and numerous other facts connected with the science of geology inexplicable under any other supposition. The importance of this question will be manifest when it is considered that if the theory here proposed be accepted as the correct one, it will revolutionize the present system of geological chronology, and dissipate entirely the Darwinian theory of evolution which is based upon it. In this connection it is pertinent to remark that it is surprising that a man of so much learning and of such extensive travel as Darwin should form such an erroneous conclusion relating to natural history as he has manifested in his treatise on the earthworm. Confining his particular observation to a small area on one of the British islands, he has assumed that the earthworm has been everywhere a potent factor in the preparation of the earth's surface for cultivation; when the fact is, that the earthworm instead of preceding man and manipulating the virgin soil for his advantage, is his follower—as much a concomitant of civilization as the common house-fly, both of them being scavengers, manifestly designed for that purpose by an all-wise Creator.

JUSTIN CHENOWETH.

S. F., Jan. 1, 1887.

Sulphur Creek District.

EDITORS PRESS:—The mining district known as the Sulphur Creek district, Colusa county, at present is not doing much. The Manzanita mine is working a few men in and about their mill and mine, but shortly expect to put on a full force. The Gibbs Mining Company, a new enterprise commenced by a number of men with a working capital of \$75,000, is prospecting and putting down a shaft about three miles up Sulphur creek and is pushing its prospect ahead most vigorously.

The Clyde mine, which is situated upon the mountain and about five miles from Sulphur creek, has just started up after a three or four months' lay-off, but is only working four or five men. This mine, if properly worked, would pay a dividend every month, but so far has been considerably embarrassed and worked in a very poor manner. But the present lessees, Messrs. Brinn and Cooper, are taking hold and intend to give it as thorough a prospecting as they will be able to in 30 or 40 days' work. But as to workingmen and miners, I would advise them to give it a wide berth, as all they want is the kind of people who will work for their board and a very small salary—about enough to keep them in tobacco and overalls.

MINER.

Colusa Co.

A NEW GOLD FIELD.—A dispatch from Washington says: Consul Figgelmess, writing from Demerara, under the date of December 9th, says there is a great development in gold mining in British Guiana, but no quartz nor gold-bearing ledges have yet been discovered. All the gold collected up to the present time is found in the rivers and creeks by washing. About 3000 people, mostly colored and inexperienced, are in the interior of the colony, prospecting. The climate is very unhealthy, especially so to the whites. The consul mentions two Californians who have been very successful in their operations, but fails to give their names. He says that \$16,000 in gold was exported to England in 1885. Last year the exportations were increased to \$350,000, and he thinks this year's exportations will reach probably \$2,000,000. He says the new industry promises to be a good one.

Spontaneous Combustion in Mines.

Some Scientific Theories as to its Cause.

Alfred Bache, of the English Institution of Civil Engineers, writing on the subject of spontaneous combustion in collieries, says: "Oxidation of the hydrocarbons on exposure to air cannot develop heat enough to ignite the coal;" and the only way in which he can account for spontaneous combustion in such coal is by the presence of dust or fine slack in the midst of any heaps that are found to be heating. Dust and fine slack he considers capable of exerting a condensing power upon the combustible gases that are ready to escape from bituminous or gaseous coal, and also upon the oxygen of the air, and the heat so developed may become sufficient to fire the gas, and thereby the coal. While, therefore, spontaneous combustion may occur in any colliery, whether the coal contains pyrites or not, it is more particularly in seams of coking coal containing pyrites that, as the workings progress, the pillars left standing grow hot rapidly, under the combined action of oxidation of pyrites, pressure and subsidence of roof, and oxidation of hydrocarbons through condensing power of dust. It is the pyrites, however, which, wherever present in any appreciable quantity, play the principal part in starting ignition, and thus constitute the primary cause of fire; the other causes are then but secondary, although they may so far supplement the start thus given as to make a seam containing but little pyrites appear readier to fire than one containing much more. The development of spontaneous combustion is considered firstly in the case of masses of coal, such as pillars left in working. Really solid pillars never fire; those that do are always fissured with numerous cracks and are more or less crushed. Outbreaks of fire are encouraged by the presence of any coal crushed small, which, in its finely subdivided state, promotes the chemical actions that induce heating. First fire smolders at the bottom of the innumerable cracks by which the pillars have become fissured under the crushing load they have to support. Then the walls of the cracks get red hot and burn, sometimes bursting suddenly into flame where the previous heating has covered them with bituminous matter. The tarry smell thus occasioned often betrays the existence of fire before it has become visible; and so difficult is it to find its actual seat that often it is not discovered until it has crept outward toward the air current at the mouth of the chinks, and has ignited the crushed coal behind the timbering of the roads and then the timbering itself. The danger is augmented wherever there are timbered excavations overhead, and still more wherever a timbered drift has been pushed forward under a mass of crushed coal overhead. Through such a mass air circulates easily, heat and moisture collect there, and fire breaks out quicker than where the overhead coal has been got out previously. Wherever crushed coal can be harbored on or among the rubbish that is packed into the goaf, fire is sure, sooner or later, to break out. It begins at some distance in from the roads and creeps out gradually toward them, igniting on the way any timber that may have been left hurried in the gob-packing; the pungent wood smoke gives immediate warning of the fire. Pillars purposely left unworked, either for maintaining a shaft or because the coal in them is not good enough, are also liable to take fire. The load bears unevenly around them, they crush and crack under it. Practical miners were well aware that with slow, sluggish currents in a seam which gave off fire-damp freely it was impossible to keep the general atmosphere of the mine comparatively pure, that is, clear of what is technically termed a "cup on the lamp," or so to ventilate the broken parts of the roof as to keep them clear of explosive gas. With sluggish currents in a fiery mine, its normal condition would be one of such peril that no prudent manager would tolerate; under such a condition of things, any local explosion of fire-damp, which under more favorable circumstances might have been harmless, would by reason of the dust and heat set up, extend itself throughout the colliery.

THE STOCKTON GAS WELL.—Last evening, in company with C. Ewald Grunsky, of the State Engineer's office, a reporter of the *Independent* inspected the gas well now being bored by Jerome Haas for a company of Stockton capitalists. After darkness had set in the gas flow from the well was lighted and it burned without stopping for upward of an hour, until the fire was put out by order of Mr. Haas. The gas supply is not yet as large as the owners of the well want to find, but they are in good spirits over the prospects. They now have enough gas to supply fuel for half a dozen places like the foundry and machine shop owned by Farrington, Hyatt & Co. Mr. Grunsky thinks the queer-tasting water now flowing from the well has many healthful properties. He says the mineral water is as pure and beneficial for debilitated humanity as can be found anywhere. Many people journey to Europe to find water containing the same medicinal virtues as that now running out of the Haas well. Mr. Grunsky is of the opinion that some enterprising manager will drop in the city and at once see great money in establishing a health resort here, and in erecting a fine house for the accommodation of wealthy invalids. Mr. Haas estimated the cost of boring

such a well at about \$5000, but he thought the supply of mineral water was worth a great deal of money, if properly handled. Adolph Hahn, of the Commercial hotel, says he could save a great deal of money with such a well in the rear of his hotel. He thinks the gas supply is more than enough to properly light up a large hotel and furnish fuel for the furnaces. Mr. Haas says he will soon cut through this gas-producing strata and bore deeper for a profitable supply. He feels certain of success if he can reach the proper depth.—*Stockton Ind.*

The State Mining Bureau.

In his message to the Legislature, the retiring Governor of the State, General Stoneman, has this to say of one of our State institutions:

The Mining Bureau was established under the Act approved April 16, 1880. It has, in spite of inadequate appropriations, made such a collection as redounds largely to the credit of the mineralogists in charge, and has afforded an object-lesson of the highest value.

Situated in San Francisco, and therefore easily accessible, it has been visited by thousands, and has been a means of disseminating information of the greatest utility to every county in the State. Many letters of inquiry have come from abroad where its usefulness is cordially acknowledged. Exchange of pamphlets, reports and specimens, have served to advertise the economical possibilities of California, not merely in the precious metals, but also as regards our oils, natural gas, clays, marbles, marls, building material, cements, irons, quicksilver, copper, tin, antimony, etc. Its usefulness can and should be largely extended, and particularly as a means of aiding practical workers, and determining the value or worthlessness of new appliances and processes. The General Government has taken charge of the purely scientific geography and geology of the State, but we need something more—something, namely, that shall be purely practical.

Under Section 2 of the Act, the Bureau is expected to provide and maintain a library of works on mineralogy, geology, and mining; to arrange in cases each minerals as may be collected; to procure and preserve models and drawings of mining machinery and of milling machinery used in the reduction of ores; to correspond with established schools of mining and metallurgy, and obtain and preserve for public inspection and use such information respecting improvements in mining and mining machinery as will be of practical value to the people of this State.

The Bureau is under the charge of successful men of affairs, practical engineers, and a perfectly competent mineralogist—all except the mineralogist serving gratuitously.

The cabinet collection of minerals now in the charge of the State Librarian ought to be turned over to the State Mining Bureau, where it properly belongs. At present it is practically useless. It is rarely seen by visitors, and scarcely ever by the class for whose instruction and benefit the State intended it should be preserved. On the contrary, if placed in charge of the Mining Bureau, it will be seen by the thousands who yearly visit the institution, and be the means of disseminating information regarding the worth and value of the mineral products of the Pacific Coast. The State Librarian strongly advises that this course should be pursued. Writing of the want of space in the library, he says:

"We are much crowded for space for the books we receive, owing to one of our large rooms being occupied by the mineral cabinet. This room is not convenient of access for the purpose for which it is used; we have neither authority nor means to care for and make additions to the cabinet collection; nor have we help sufficient to show and make it a pleasure to visitors. It is practically valueless where it is, and I therefore suggest that it be removed and the room properly fitted up for library use. Legislative action is necessary to the accomplishment of this."

THE GOLD SURPLUS.—Chicago *Times* Washington special: Whatever danger there was some time ago that the treasury supply of gold would give out and the Government be compelled to pay out silver for bond redemption, seems now to be remote and growing more so. The gold owned by the Government now amounts to \$170,912,413, a larger sum than the Government has owned previously since the resumption of specie payments, with the exception of the single month of November, 1881. The stock of gold has been growing continuously since July last in spite of the large redemption of bonds. The increase in the stock of gold for December was a trifle less than \$7,000,000, and for the half fiscal year a little more than \$14,000,000. At the same time the stock of silver dollars which recently threatened to absorb everything in the treasury has been for some months steadily falling off, though coinage goes on without interruption.

NEW PLACER MINES.—The placer mines in North Bernalillo county, near Golden, N. M., are the richest in the United States. Recent tests from the grass roots down—not reaching bedrock—averaged over \$2.50 per cubic yard. Miners are flocking into Golden daily. The quartz leads a few miles north of Golden are yielding very rich ore, and the miners who have secured claims in that vicinity are all counting money. It is the coming camp in the West.—*Albuquerque Journal*.

Silver in Litharge.

At a recent meeting of the American Institute of Mining Engineers, Prof. Chas. Wait, of Rolla, Mo., read the following paper on "the condition of silver in a sample of litharge:"

In the analysis of a set of interesting furnace-products belonging to the metallurgical cabinet of the School of Mines, I placed in the hands of one of my students a sample of litharge which gave the results quoted below. The collection of specimens from which this was taken represents the products obtained in the blast-furnace treatment of argentiferous lead ores, also samples from the zinc process, and those from the cupellation of the enriched lead.

The sample, when received, was marked "bismuth litharge," and was that obtained during the last stages of cupellation. It gave upon analysis the following:

	Per cent.
Lead	85.36
Antimony	.06
Bismuth	.20
Copper	.49
Iron	.60
Zinc	.18
Nickel	.01
Silver	2.94
Linne	.26
Magnesia	.03
Silica	.03
Sulphuric anhydride	.12
Carbonic anhydride	1.25
Water	.24
Oxygen	7.80
	99.95

At present I wish merely to call attention to the large percentage of silver present (equal to 857 ounces Troy per ton of 2000 pounds avoirdupois), and also to note two or three determinations that I have recently made, with a view to ascertain, if possible, the condition in which this silver exists.

If I mistake not, it is usually assumed that silver exists in litharge in the metallic state; and it is, indeed, in the analyses of litharge, rarely expressed otherwise. This method of reporting the silver is, no doubt, due to the accepted statements that the oxides of silver are reduced to the metallic state at a temperature of 300° C. or less.

The following experiments lead me to believe that silver exists in litharge, not entirely in the metallic state.

1. A weighed sample of litharge was digested in boiling acetic acid for about half an hour. The solution was filtered. The filtrate gave no reaction for silver.

2. Same experiment as above with continued boiling. The solution being filtered, the filtrate gave no reaction for silver.

3. A sample was placed in cold acetic acid, then heated to boiling. The solution was filtered, and silver was found in the filtrate. The estimation gave: Silver dissolved, 19.25 per cent of the silver present in the litharge.

4. A sample was treated as in the last experiment. The estimation gave: Silver dissolved, 18.67 per cent.

5. A sample was placed in cold acetic acid, and gently warmed for a few minutes. The estimation gave: Silver dissolved, 10.47 per cent.

6. The residue in experiment 3 was examined and found to contain 2.7 per cent in lead. The sample in each experiment weighed one-third of an assay ton.

I have placed the following interpretation upon the results obtained above: In Nos. 1 and 2, if silver in any form whatever was dissolved, it was in turn reprecipitated by boiling. In Nos. 3 and 4, the silver dissolved did not, in all probability, exist in the metallic state. In No. 5, the solution was not sufficiently heated. In No. 6, the lead which remained undissolved probably existed in a rich alloy with silver, which resisted the action of the solvent.

A few experiments were made which assisted me in interpreting the above, by showing that neither metallic silver reduced to fine subdivision by mechanical means, nor silver freshly prepared by zinc from silver chloride, is soluble in acetic acid, while argentic oxide is soluble in that acid. A solution of silver oxide in acetic acid was precipitated completely by metallic lead.

From the results stated above, I believe we are justified in our conclusion, that silver may exist in litharge in a form other than in the metallic state. In this case, the analysis shows the percentage of silver to be very large, which, no doubt, is due to quick and hot work; and if the oxides are decomposed at 300° C. or less, in what form, then, may I ask, does this silver exist?

In the direction of an answer I will add, that some experiments have shown me quite satisfactorily that silver is not an exception to the metals to which litharge gives up a part of its oxygen when fused with them for a considerable time.

ALUMINUM IN SAN DIEGO.—Aluminum is believed to exist in this county in large deposits. Samples of this valuable metal, or rather samples of a metal which bear the strongest possible resemblance thereto, have been shown a *San* reporter, and the mayhap lucky prospector, who alone knows the place of its existence, will at once proceed to ascertain the real value of his discovery.—*San Diego Sun*.

THE SILVER MONUMENT MINE, Humboldt district, Arizona, during the past four months, has shipped to reduction works over \$30,000 worth of ore.

Self-Murder and Society.

The frequency with which men and women, and even children, resort to suicide as a means of escaping real or imaginary evils, is a subject of almost daily comment. Scarcely a paper issues that does not chronicle a fresh case of self-murder. From what cause springs this alarming tendency to self-destruction? Our social philosophers, insurance men and fraternal men are toiling at the problem. When it is proved before a coroner's jury that the suicide had domestic trouble, or reverse of fortune, or was intemperate or in poor health, or had been disappointed in love or ambition, all inquiry ceases. But a good theory is one that seeks to group all the infinitely various determining motives in the unity of one primal law. Can such a law be discovered? In what direction shall it be sought? The great Italian alienist, Henry Morelli, in his elaborate essay on suicide, says: "The motives which impel the suicide to quit life are not beyond social laws; indeed, man would never have destroyed himself if he had lived far from other men, and had not shared in the misery of his fellow-creatures. The more humanity advances, the more it tends to the common association of forces; therefore, the savage appears to be freer in his virgin forest than the civilized man in his splendid cities." Here is foreshadowed, perhaps, the direction in which the final solution may yet be found.

In the mean time it is evident that the organizations of capital and labor have robbed both rich and poor of their individuality and made all men mere parts of a machine. Before the era of railroads and steamboats and telegraphs every shoemaker, tailor or blacksmith had his own shop, but now these and all other forms of artisanship are merely parts of a machine, and this machine usually takes the form of corporate control. Even the men who manage the machine are parts of the mechanism. Life is reduced to a time-table. We eat and run to work by the ring of a bell or the shriek of a steam whistle. In short, nearly everything pertaining to existence in these days is so nicely adjusted that life has become a treadmill monotony, and perhaps it is not too much to say that nine out of ten who commit suicide are impelled to it by the dull and joyless barrenness of their lot.

Then, no doubt, many men and women commit suicide in these days not because they have loved and lost, but because they are unable to find anything to love. How many men and women can say that they have one true, tried and devoted friend? We once knew a man who advised all his acquaintances when they were in trouble to go and tell their wants and grievances to the wooden Indian that stands before the cigar store. He believed that half the world would agree with him that the advice was good. It is at least certain that one reason of the frequency of suicide is the fact that everything is so arbitrarily and nicely adjusted that there is no time nor room for friendships. Whatever may be the immediate cause, we may be certain that life to the unfortunate has become void and barren of hope. Men of the church, men of our fraternal Orders, think of this! You may help to remedy this evil in some degree. It is obvious that the only cure is in the nature of a preventive; in whatever more evenly distributes the burdens of life and helps to make the world more bright, joyous and beautiful.

NEW MILL.—Burger & Co. are now putting up a ten-stamp mill near Campo Seco, in the western part of Calaveras county, for working gold quartz. The company has a mine that will pay \$10 a ton, and with this grade of ore they expect a handsome profit. One mile south of Campo Seco an English company is erecting an 18-horse power centrifugal mill or crusher, to be used in a gravel claim. This mill is of a late patent, and will be the second of the kind in use on the Pacific Coast. It is a novelty, and is considered by good judges to be a great success. The machine consists of a strong box and two short shafts a foot, more or less, in diameter. These shafts go through the box at opposite sides, and the ends (which are concave) do not touch inside the box by 10 or 12 inches. Outside of the box the shafts are provided with drums and belts, and are made to revolve with astonishing rapidity in opposite directions. A vacuum is thus created between the inside ends of the shafts and the gravel drawn up, and as one stream goes one way and another mass of gravel goes in the contrary direction, it is by its own friction ground to an impalpable powder, and then forced through sieves in the side of the box. —*Stockton Mail.*

THE HIDDEN TREASURE.—*Placer Republican:* The Hidden Treasure mine, at Sunny South, was located in January, 1874, by M. H. Power, W. Cameron, H. K. Devey, L. P. Burnham, R. J. Thomas, J. Mutchler, E. R. Guilford, S. Huffaker, D. Roberts, and G. C. Coker. The first pay was struck in the spring of 1876, but no gravel was taken out until the spring of the following year. Since then the gross yield of the mine has been \$950,000, with a net profit of over \$250,000. The character of the gravel is white quartz and the tunnel is about 6000 feet. The track in the tunnel is laid with steel rails, 30 pounds to the yard, and 40 cars are used for removing the gravel. The width of the channel varies from 200 to 400 feet, and a force of 75 men are employed at the mine. The

altitude of the tunnel at the mouth is 3700 feet. The gravel is so soft that it does not require milling, but is washed at the dump where there is a capacity of 500 carloads, while the water comes from the mine. There has never been an assessment levied since the company commenced to extract gray gravel, and the future outlook of the Hidden Treasure is most promising.

Mexican Bullion and Coinage.

Mexico has been yielding an average of over \$20,000,000 per annum in silver for many years. The total for the last fiscal year of 1885-86 was as follows:

Silver bullion	\$26,000,000
Gold bullion	450,000
Total	\$26,450,000

The silver product of Mexico has increased from \$21,400,000 in 1877-78 to \$26,000,000 in 1885-86. The gold produced in the same interval has varied from \$380,000 to \$662,000. The yield of both metals for the past nine years has been as follows:

Silver bullion	\$212,632,500
Gold produced	4,107,013
Total, 9 years	\$216,739,513

Comparatively little silver bullion is exported from Mexico, the bulk of the product being sent to the private mints for coinage. These mints are reported to have coined \$25,850,000 in silver dollars and \$425,000 in gold dollars in the last fiscal year, or within \$175,000 of the total bullion product for that year. There must be some mistake at this point, because Wells, Fargo & Co.'s express handled \$1,627,200 in silver bullion from Mexico last year and \$469,500 in gold bullion. The coinage of the Mexican mints for the last 14 fiscal years was as follows:

Silver dollars	\$317,964,419
Gold dollars	8,449,164
Total, 14 years	\$326,413,583

More than one-third of the silver dollars coined in Mexico last year passed through San Francisco en route to China.

A FIRE-VOMITING GEYSER.—The greatest discovery of the age was made in the Bad Lands Wednesday morning. Two hunters who have been camped in that region for several weeks, were awakened by a terrific shock and a roar that sounded like the rushing of a mighty torrent. Running out of their camps, they saw a stream of fire over 100 feet in height, shooting into the atmosphere. This immense blaze poured through the crust of earth for over an hour, when it ceased. In about five minutes after the cessation, another eruption took place, the flame being about 30 feet high, but this was followed, in about ten minutes, by another blaze nearly as high as the first. It is the greatest and most interesting discovery made in the Northwest for many years, and is the first geyser of fire, as it has been christened, to make its appearance in the land of endless wonders. It is accounted for by the fact that there are numerous beds of coal constantly burning in the Bad Lands, and this is the result of the bursting forth of the united gases. All who have passed through the Bad Lands by way of the Northern Pacific have been interested in the burning veins of coal, which rains, snows, and years have failed to extinguish. The phenomenon which made its appearance yesterday is said to be located about ten miles south of the Northern Pacific road, and if it does not die out, will be the greatest attraction on the American continent. When last heard from, the flames were being emitted about every 15 minutes, and varied in height from 10 to 40 feet. The aperture in the ground is small, and the noise that accompanies the eruptions is like the roaring of a cataract. —*Bismarck Tribune.*

CONDENSING FROM MINE PUMPS.—D. H. L. asks how to get rid of the exhaust in the mines, on account of the unpleasantness of steam. Tell him to attach a special condenser. I will tell you what I saw in Wyoming about 14 years ago. The Rock Springs coal mine had a Cameron pump with about a four-inch discharge to keep the water out of the mines. The boiler to the pump was on the surface, and the pump was over 300 feet away. A few feet below the pump there was a tee in suction, and one branch ran a few feet to what the miners called a sump, and the straight pipe ran about 80 feet further to another sump. Each pipe had a stopcock to regulate flow, and the pump drew from bottom at once. The exhaust was run into the sump near the pump, and the water allowed to cover the end of the exhaust pipe about four inches, or enough to keep the exhaust from opening the water and escaping into the air. The height of water in pipe was regulated by the stopcocks, and the water ran in fast enough so that the temperature was raised but a trifle. This arrangement seemed to work good, and as the pump only made about 75 or 80 revolutions per minute, the back pressure was slight. —*Frank Hill in American Machinist.*

THE PEOPLE AT UKIAH are delighted over the prospect of an early connection by railroad with the outside world. The final survey of the Cloverdale & Ukiah railroad was completed to Ukiah, Mendocino Co., last week, a distance of 29 miles, under the management of Engineer Frank K. Zook.

Food Adulteration and Congress.

A national convention is called to convene in Washington City, D. C., the 19th of this month, for the purpose of securing congressional legislation against food and drug adulteration. The evil is national in extent, and it is quite impossible to secure uniformity of action between the States, and the consequence is that if one State makes a stringent law, the people who live on the borders of a State that permits adulteration would be poorly protected. The benefit of congressional legislation would be that a law preventing the manufacture and sale of adulterated food and drugs would be uniform, at least so far as importation and interstate commerce in vitiated provisions is concerned. It is time something was done, and no uniform and vigorous remedy can be applied by isolated State action. The extent and variety of food and drug adulteration would seem incredible were it not that the facts have been officially ascertained. There is scarcely an article of food that can be bought with any assurance of purity and wholesomeness. Trade guarantees are worth nothing. If manufacturers and dealers have no more principle than to persist in silently, under the cover of the mysteries of their business, to adulterate and poison provisions, drugs and delicacies, there is but one redress left, and that is summarily to break up the whole business, by stringent legislation. A good beginning was made against fraudulent butter in the shape of oleomargarine; let the good work go on till the market is thoroughly purged of this class of frauds.

The protection of the life, health, property and happiness of the people is the primary aim of government. It should stand as a wall of fire between them and all invasions from without or violence within; from open assault or covert danger. It is for this protection the people pay their taxes and give their personal valor in time of war. Where does this protective function of the Government cease? Has it done all that should be expected when it hurls back the invader, subjugates treason, puts a stop to smuggling and counterfeiting, punishes murderers, burglars and incendiaries? By no means. It should punish the adulterators of meat and drink as rigorously as robbers and murderers. They are worse than the average murderer who kills in a heat of passion, for they kill off thousands of innocent people by the slow processes and homeopathic doses of dirt, nastiness and poison, from the sheer lust of gain. The Borgias and others of that accursed race were actually less culpable. They killed units, while the modern vender of deleterious compounds insidiously assails the health of a whole community and shortens the average duration of human life. Better a thousand times an occasional dose of poison by a Madame Brinvilliers than vile, unwholesome admixtures in our sugar, syrup, coffee, tea, pickles, canned fruit, lard, butter, oil, curry, and a host of other articles in every-day use.

When a president of some great manufacturing concern runs away with the funds, the newspapers all have words of sympathy for other capitalists and corporations that are involved, but seldom mention the poor workers. They are really damaged more in proportion than the money-lenders, for the latter only lose from their surplus, while the former suffer for the necessities of life. They are likely to have small wages still further reduced, and perhaps withheld for weeks, and the chances are that many of them will be thrown out of employment altogether. —*Hartford Examiner.*

EVERY human being who is not born to a fortune has a labor problem of his own to solve, and the time will probably never come when a very large number of men will not keep trying to make somebody else solve it for them. The greatest need of our age seems to be the huckling of each man to his own labor problem. Every man should try to help his neighbors to hear his burdens, but every neighbor should refrain from trying to unload on him. —*Evening Post.*

THE CLAY STREET TUNNEL.—The matter of granting permission to the Clay-street cable line to cut a tunnel under Lafayette Park was considered last week by the Street Committee of the Board of Supervisors. The majority of the members expressed themselves as being favorable to the proposition, but they deferred definite action until after they have made a thorough examination of the ground. If the permission is granted, the cable line will be extended to the park.

The combined outflow from 26 artesian wells sunk in Sierra Valley is 767,520 gallons every 24 hours. The most expeditious work done was the sinking of three 600-foot wells in one week. The wells range in temperature from 40 degrees to 130 degrees. In all cases the water has proven to be good and palatable, both for drinking and culinary purposes, and much superior to any surface water for washing. Cattle and horses invariably drink of it with great avidity.

STOPPING THE FLOW OF WATER IN SHAFTS.—Mr. L. Tietjens, of Stassfurt, Germany, has recently patented an ingenious method of damping back the flow of water in shafts by the application of the well-known fact that certain salts increase their volume very materially by

the absorbing of water of crystallization in hardening. To accomplish this he takes either calcined soda, anhydrous alum, kieserite, or oxychloride of magnesium, mixes them into a paste, and then immediately injects them through a suitably arranged pipe into the fissures through which the water flows. It is said that as this paste hardens, it swells enough to fill all the interstices of the rock and to render it water-tight.

Lick Observatory.

Its Transfer to Be Made in July.

Prof. Edward S. Holden, president of the State University and director of the Lick Observatory, has returned from a six-weeks' trip to the East, where he has been making some final preparations for the completion of the Lick telescope and observatory. He has contracted for the construction of a micrometer and spectroscope among other things. The former will be made by Fauth & Co., of Washington, and the latter by Brashear & Co., of Pittsburgh. Both instruments are to be completed by June 1st. The contract for the stellar spectroscope calls for the finest and most powerful glasses in the world, and by its results of great importance are expected. The use to which it will be devoted will be the determination of the motion of stars in the line of sight, from which the real motion and that of the entire solar system in space can be determined. While the relative motions of the component members of the solar system are not known with precision, the motion of the system itself is yet understood with comparative imperfection. Observations with the spectroscope on certain distinct stars to determine their relative changes of position have been made to some extent at the Greenwich and other observatories, but the spectroscopes used are inferior to the one which is now being constructed.

Prof. Holden says that the expectation is that the formal transfer of the observatory buildings and instruments will be made in July. The mounting for the crown and flint lenses and the dome will, it is believed, be at Mount Hamilton by June 1st. As assistants, Prof. Holden will nominate S. W. Burnham, of Chicago, and J. E. Keeler, who is now at the observatory. Mr. Burnham is at present the official reporter of the United States District Court at Chicago. "He has devoted himself to practical astronomy in his leisure hours, and he is the most celebrated observer of double stars in the world, having himself discovered over 1000 such. He visited the Lick Observatory at my request in 1879 and made observations for three months there, and again in 1884 joined with me in the observation of the transit of Mercury. He is also one of the best astronomical photographers. He will work with me on the large telescope. J. E. Keeler has already been in the employ of the Lick trustees for several months. He is a graduate of Johns Hopkins and Berlin universities. For a long time he has been the assistant of Prof. Langley, the famous observer of the sun, at the Alleghany Observatory. Mr. Keeler is a specialist of reputation in astronomical physics, and will devote himself mainly to observation with the spectroscope."

The leading astronomer of the world will be invited to the observatory, and will be likely to accept the invitations to be offered them.

GENIUS, TALENT AND TACT.—THE WAY THE WORLD GOES.—The man of genius is busy; the patent examiners groan and wonder when they will all die. The man of talent sifts the ideas of the genius in order to find something that has commercial value, and when he does hit a kernel of wheat, he straightway looks for a man of tact, and they two devise a scheme to rob the genius of that, whose birth robbed him of much "gray matter." This is the era of invention, and thousands are busy solving the problem how to get something for nothing. We hear of the successes, but who hears of the failures? It was said, many years ago, that the genius goes hungry, dies in the garret, but his glory comes after he has died. The man of talent is useful, when properly steered; is shabbily genteel, and is known while living, forgotten when dead. The man of tact is a power in life, is courted, flattered while living, piles up brick and stone to serve as monuments of his greatness; but his grandchildren learn all his efforts were in vain—the city has grown, and his monuments are sacrificed to make room for the hordes who have small respect for "dead men's bones." So goes the world.

REDUCTION WORKS.—Good reduction works are needed in the Ophir district and would pay. It is close to the railroad, water-power might be had, and the place is situated in a district full of rich but refractory quartz. Works with the latest improvements and devices might do as well as at San Francisco, Reno or Denver. —*Placer Republican.*

SALT ARTESIAN WATER.—An artesian well being sunk at White Plains, Nev., is down over 2300 feet, and can go no further until the water, which is 17 per cent salt, and so heavy that the ropes and tools float on it and the drill does not penetrate the rock, is shut out.

PLACER MINES, in Arizona, are yielding from \$2 to \$5 per day. The separating of the gold from the gravel is being done in rockers.



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Saturday Morning, Jan. 15, 1887.

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Passing Events.

The discovery of natural gas in several portions of this State has led to further prospecting, and it is not improbable that in another year several localities will be supplied with it. A supply of this material will be of the greatest use on this coast, where coal is high priced.

Several of the northern counties of California have established immigration bureaus at Los Angeles in order to set forth to new arrivals the advantages of other sections than Southern California. Much cheaper land and that which is just as productive can be had in the central and northern portions of the State, but Southern California has been so well advertised that it is attracting most of the population.

The remains of James Lick, the California philanthropist, who died over 10 years ago, were deposited in the final resting-place this week, in the pier which supports the great telescope, provided by his munificence, at Mount Hamilton, Santa Clara county.

Water is scarce in the mountains, and, as little snow has fallen, no very long winter season is expected in those parts of the State where it is needed for mining purposes. The farmers are also becoming nervous about the scant supply of rain this winter.

Mining Mistakes Further Considered.

Remarking further on the mistakes most common in mining, it may be observed that among these is the practice so prevalent with miners of dividing up their work on a number of claims instead of concentrating it on one or two, and so developing these that they can be made a source of income to the owners, while they are brought into presentable shape at the same time for the market. It is true, investors would find it at this day much to their advantage to buy mere prospects, and at their own expense do the work of development upon them. But experience shows that thus far they have not, as a general thing, been willing to do this. Wherefore, the claimholder, if he desires to effect a sale of his property, will, in order to accomplish this, have to do enough work on his location to show that it possesses some real and tangible value. This done, there is a chance of his getting buyers to look at his mine, but none without it. There is something of a disposition being shown just now to invest in the gold mines of California; but, unaccountable as it may seem, nobody cares to buy a mere undeveloped prospect, however promising it may be, or however little may be asked for it. Of course, we look for a change in this respect; but we are now consulting the interests of miners under existing conditions and write for the present.

Another of the old-time mistakes consists in putting up reduction works before ore developments warrant the same. This is a mistake that, incredible as it may appear, meets with constant repetition, the late costly Iron Mountain outfit being a case in point, not to mention the two notable examples that occurred not long since in the vicinity of Sierra City, one of the oldest quartz-mining localities in the State. What aggravated the mistake in this instance was the fact that these costly improvements were made under the advice of several prominent mining experts, and the failure of these enterprises entailed heavy losses on the investors. One of these mills has since been removed and put up elsewhere, the other remaining a monument of dead works and financial ruin on the spot where it was first planted. It really looks as if our miners would never learn business sense in this particular, the proclivity to anticipate requirements of this kind appearing to be inherent to the business. It is, however, gratifying to learn that the Iron Mountain fiasco has had a salutary effect in Shasta county, the site of its occurrence, inspiring the hope that similar blunders will there be avoided in future. But Shasta was not without similar lessons before. There are standing along the south fork of Clear creek, and within a space of two or three miles, several large and costly establishments put up there many years ago for beneficiating the rich but rebellious ores of that district. But they all proved signal failures, and having been idle for a long time, remain now partially or wholly dismantled. Lately the plan of concentrating these ores has been adopted, and as this can be effected with cheap and simple machinery, the business has been found to be profitable, these concentrates, which are of high grade, being sold to the Selby Smelting Works. While such is the method of treating the silver-bearing ores of the above district, the auriferous quartz, which occurs in small, rich veins, is crushed with arrastras, this, again, having proved a better way for disposing of this class of ore than working them in large mills, as formerly practiced. Having hit at last upon the right method, the Shasta miners will now be likely to prosper if they adhere to them. Like many others, they found out by experience that they had something to unlearn as well as to learn.

There are other mining camps in Shasta, and in Trinity county adjoining, where the inhabitants, by going a little slow and opening up their mines well before buying expensive plants, have succeeded in placing the business on a profitable footing. Though advancing rather slowly, they have all the while been progressing, and have yet to make their first failure.

Now, lest investors should jump at the conclusion that this is the place to go to buy mines, let us inform them that it is not—there are no mines there for sale. The owners are nearly all practical miners. They live on their properties, and, having opened and equipped them in good shape, do not care to sell them, well knowing that they are worth more to them than

they can be to anybody else. The most of these men have lived in these several districts for many years, and, being familiar with the vein system, know best how to open the mines and work the ores. With all these advantages, having at last got their properties into a productive condition, they are not, as a rule, anxious to part with them. Then, while these mines can so be worked with profit by the present owners, they are not, as a general thing, extensive properties, such as would require heavy capital to work them to advantage; hence they do not invite large investments.

But having got his mine fairly opened and equipped with suitable plant, it has been too little the habit of the California miner to keep the work of exploration well ahead of ore extraction. While this is a point that in older mining countries is carefully attended to, it has here too often been neglected.

It has been with us too much the practice to go for immediate results; to care for the present, leaving the future to care for itself. We have preferred for our mines a short and fast rather than a long and healthful life. This policy must be amended before mining can establish itself in favor with conservative investors, who will embark their means only in ventures of a solid kind. They prefer long-continued, steady, and certain returns, even though small, to such as are always fluctuating, and even though for the moment large, are likely at any moment to end. The hand-to-mouth style of mining is at best precarious, and must, to all concerned, prove unsatisfactory, if not finally ruinous. It is deficient in the primary element of a safe business. It is like a merchant realizing on his stock and making no provision to replace it, or a forester cutting down his trees and planting no new ones.

What renders advance exploration the more imperative is the rapidly exhaustive styles of mining practiced at the present day. With the tremendous engine now in use, ore is extracted and disposed of at a rate that makes it unsafe to trust to small reserves, which, giving out unexpectedly, may bring operations to a dead halt. The miner should remember that it costs no more to do this sort of work at one time than at another, and being done in good season enables him to shape his course accordingly.

It would be well if our miners would pattern more after those engaged in other branches of business. This would tend to make them more persevering, painstaking, and patient; teach them that it is not always the best policy to make haste to be rich. They should reflect what of time and toil, what of study, anxiety and self-denial, it takes for a merchant or a manufacturer to build up a profitable or even a living business; what a deal of sweating, waiting and grubbing it takes to improve a farm or cultivate a vineyard. If the miner would work and save, and forecast the future as do men following these other pursuits, a large and almost sure success would await his efforts. His vocation is an honorable and useful one, but it is the misfortune of many engaged in it that they have, during the flush days of the business, been betrayed into the habit of trusting to luck or otherwise too much discounting the future.

Water-Power Stamp Mills.

The use of water-power for running quartz mills, hoisting apparatus, etc., is gradually increasing on this coast. In Nevada county it has been particularly successful, and even the big 120-stamp gold mill at Douglas island, Alaska, uses water for power. The excellence of the Pelton and Knight water-wheels has had much to do with this advance, both of these appliances being powerful and economical. Of late, wherever it has been possible to obtain water for power, even when it has to be conveyed long distances, water-wheels have been put in instead of steam engines. Of course there are many places where this cannot be done, but the matter is being investigated in many mining regions where heretofore it has not been thought of.

On the Comstock the deep pumps have been run by hydraulic power for a long time, though since the closing down of the work on the lower levels these big pumps have stopped. Now, however, the Comstock mine-owners are desirous of having cheaper ore-crushing facilities, so as to work their abundant low-grade ore more cheaply than before. The Chollar and Potosi

Mining Companies have purchased a site east of the Chollar old shaft upon which to erect the first of a series of quartz mills, with 40 stamps each, to be operated by water-power, for crushing ore from the two mines. The water for driving the mills will be supplied through a new flume, now in course of construction, between Virginia City and Marlette lake, located in the Sierra Nevada mountains, near Lake Tahoe, 27 miles distant from the Comstock lode. The water will be conveyed 20 miles through wooden boxes and carried across the Washoe valley through a 12-inch wrought-iron tube in the form of an inverted siphon. The pipe was manufactured in Pittsburg, Pa., and is seven miles long, and is now in transit. The management anticipate having the water in and the first mill in operation by the middle of next June. The water heretofore used in operating the hydraulic pumps at the Combination shaft will be utilized as an auxiliary motive power for driving the projected mills, and will add a flow of 2,000,000 gallons daily to the pressure. Other mills will be subsequently built in Six-mile canyon, the abrupt fall of which will admit of water being caught up, and by fluming it a mile lower down, fall sufficient will be obtained to propel another mill of the same capacity. The projectors ultimately contemplate the erection of seven mills between the workings of the Comstock lode and the mouth of Six-mile canyon with a combined crushing power of 280 stamps and a pulverizing capacity of 1000 tons of ore daily.

Foundry Notes.

The Risdon Iron Works have had more or less quartz-mill work of late. The 30-stamp mill for the Rathgeb mine, San Andreas, has just made its first cleanup, and a very satisfactory one, too. The mill is owned by an English company. A new 30-stamp mill being built for W. B. Bourne, for the North Star mine, will be ready for work on the 1st of February. It will be run by water power. The Ives mill, at Shingle Springs, is to have pans and settlers, which are now being made at the Risdon. The gold is so fine that the ore will be worked in pans just like a silver mill. Two of the Bryan patent quartz mills were shipped two years ago to Mexico for a mine belonging to Mr. C. Waterhouse, and have given satisfaction. The Risdon works will take measures for introducing these mills more generally.

They are putting in a good many of the Fox corrugated furnace flues, recently illustrated in the PRESS. They are being used on marine and land boilers. Some 18 of the furnaces are being brought out here for the new boilers of the City of Pekin.

A number of the Heine boilers are being sold also. One has recently been built for the king's palace at Honolulu, which is highly ornamented. It is covered with crowned heads, gilt, etc. It is intended for part of the plant for lighting the king's palace with electricity. The Risdon works are also doing considerable sawmill work. They are furnishing several of Robbs' patent saw edgers, one very large, to edge 12-inch timber, 60 or 70 inches wide.

The Union Iron Works have removed their downtown offices from the corner of Market and Fremont streets to the north side of Market street, No. 216, almost opposite the old location. The removal was necessitated for the reason that the old building is to be torn down to give place to a large new one.

The Fulton Iron Works have nearly completed the machinery and boilers of the new ferry-steamer for the South Pacific Coast R. R. Co., and a very large force of men are engaged in the construction of the hull. The new steamer will be similar in plan and construction to the Garden City, and will be built to accommodate either freight or passengers. The cabin accommodation will be particularly elaborate, while the tonnage will be somewhat greater than either the Bay City or the Garden City.

If the several projected quartz mills to crush the low-grade Comstock ores, and to be run by water-power, are built shortly, our local foundries will obtain some good jobs. The combined capacity of the mills will be about 280 stamps.

The San Francisco Tool Company is engaged in making a number of centrifugal pumps.

It is rumored that the office of State Chemist is to be recreated.

The Legislature.

The members of the Legislature have so far spent most of their time in filling places and causing concerning places to be filled. The flood of bills has commenced to pour in, however, some of these being relics of the last session. Among those measures proposed which will interest our readers may be summarized as follows:

In the Senate, Goucher has introduced a bill appropriating \$125,000 for the maintenance of the State Mining Bureau. This far exceeds previous appropriations, and should it be granted, would place the Bureau out of its present impecunious condition, and, of course, admit of greatly extending its usefulness. Moffitt's bill to establish a State weather bureau appropriates \$5000 for the wants of stations, and \$6000 for carrying on the necessary work. Rose's bill declares the last Saturday of January a legal holiday, to be known as Arbor Day. Walrath has an act providing for the impounding of mining debris. Rose has a measure to enlarge the powers of the Board of Forestry as sheriffs, and also to appropriate \$30,000 for salaries for two years. McCarthy's act regulating State prisons provides that no labor of convicts be allowed, except in the jute department. Vrooman wants to provide for the permanent support of the University of California, by levying annually a tax of one cent on each \$100 valuation. Jones wishes to amend the act giving a lien to loggers and laborers upon the logs cut and hauled by their employers. A bill by McCarthy is to provide for the better protection and security of life and property in the use of steam boilers. It provides for the appointment of an Inspector of Boilers.

The Assembly bills are very numerous. Seary's bill, regulating the employment of gripmen, conductors and drivers on street railroads, provides that such railroad corporations may not place a gripman, conductor or driver on any car unless he shall be duly licensed, said license to be free, but only to be granted to a person who has had three months' service as an assistant in such work. In case of accident to any car or dummy, if it shall appear that such car was in charge of an unlicensed person, it shall be proof of willful negligence on the part of said employers. A violation of this Act is punishable as a misdemeanor by imprisonment in the county jail of from one to three months.

Ohleyer's bill, relating to contempt of court, makes a repetition of the offense a felony. As the law now stands, large corporations are continually paying repeated times for breaking the law; in other words, paying a license to commit illegal acts. This bill proposes to check this.

Lawrence's insurance bills place assessment associations, insurance orders, etc., on the same footing as the regular companies. He will shortly present another bill in which it is ordained that all telegraph wires shall be laid underground.

Bost has an Act to promote irrigation, and regulating the distribution of water used therefor. It provides that the Governor, Surveyor-General, Attorney-General and State Engineer shall constitute a Board of Irrigation Commissioners to divide the State into irrigation districts and organize the same; the board to have the control of all the water in reservoirs taken from river-channels, etc., during the rainy seasons as may be needed in the several irrigation districts.

Cohen's Act, to protect the manufacturing interests of the State, compels manufacturers to label their goods. Regan has an Act similar to Senator McCarthy's on the subject of security of life and property in the use of steam boilers.

STEAM PIPES AND WOODWORK.—The Fire Underwriters' Inspection Bureau call the attention of property-owners, architects and builders to the great danger of steam pipes in contact with wood, and ask their assistance so that in future the provisions of Order No. 1752, Section 28, of this city and county, shall be complied with. This order provides that no steam pipes shall be placed nearer to wood than three inches, unless protected by a ring or tube of soapstone or earthenware.

THE California State Board of Forestry has issued its first biennial report for the years 1885-86. The report is received just as we go to press, so we have had as yet no opportunity to examine it.

The Penberthy Automatic Injector.

This injector is intended for stationary, marine and portable boilers, and is so made as to be automatic and restarting at every point within its range. The engravings given herewith show its construction and application. Fig. 1 is an outside view of the injector. Fig. 2 is a vertical view in which *A* is the tail pipe, *BB* steam jet, *C* suction tube, *DD* delivery tube, *E* ring, *H* valve, and *K* overflow cap. A great advantage of this injector is its inside mechanism, which consists of a removable delivery and suction tube or jet. This makes it easily cleaned, and there is little or no wear on the body, so that when the different tubes are replaced the injector is as good as new. It will work well in smooth or rough water at sea; and no matter how much air gets into the suction pipe, the injector will expel it and continue working. The working range is from 20 to 135 and 150 pounds steam pressure; will lift water

in the suction pipe full, also the valve *D* in the steam pipe, and in a short time the water will appear at overflow. Then gradually close the valve *H* in the suction pipe *I*, and the water will stop at overflow when the injector will be working. As steam rises, the valve *H* can be gradually opened until the injector takes all the water. Where this variation of steam used is not over 40 pounds after the valve *H* is once set, it is only necessary to turn steam on and off and the injector will start automatically. A leak at the overflow is caused by too much or not enough water, or a leak in the suction pipe. When a long lift is used, it takes several minutes to bring the water to overflow.

Borax.

Until 1872 all the borax used in this country was either imported as such or was manufactured here from imported boracic acid; but

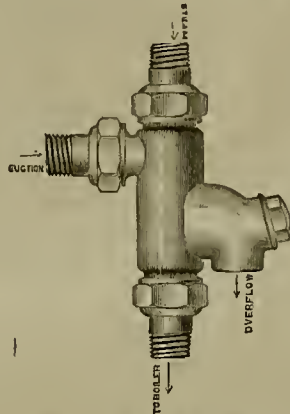


Fig. 1.—PENBERTHY INJECTOR.

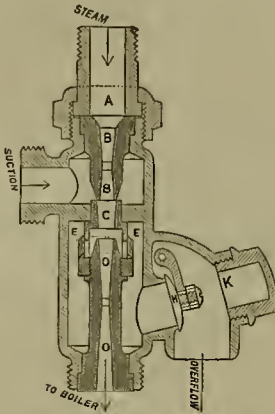


Fig. 2.—SECTIONAL VIEW OF INJECTOR.

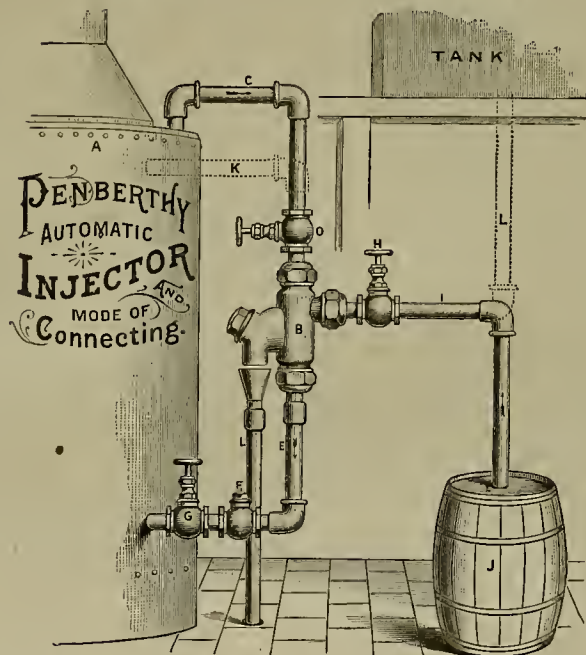


Fig. 3.—MODE OF CONNECTING PENBERTHY AUTOMATIC INJECTOR.

20 to 25 feet, and force hot water at 100° to 120° F. Within a range of 40 to 50 pounds pressure it is only necessary to operate the steam valve, so that once started under most circumstances, it is a one-valve injector.

Fig. 3 shows the method of connecting the injector. In this *A* is the boiler, *B* injector, *C* steam pipe, *D* globe valve, *E* delivery pipe, *F* check valve, *G* globe valve, *H* globe valve, *I* suction or water pipe, *J* water, *K* mode of connection in cases where top or dome of boiler cannot be tapped, *L* pipe to tank when water flows to injector. The globe valve *G* is not necessary, but should be placed next to the boiler in case of accident to the check valve *F*, and always remains open. All other valves are necessary. The length of pipe and condition will vary according to circumstances, but the mode of connection must always be the same.

To clean the injector the tube nut connecting the delivery pipe *E* is removed, and the jet will drop out into the hand, and when steam is turned on all dirt will be removed. To operate this injector the following directions are given by Parke & Lacy, 21 Fremont street, San Fran-

cisco, this Pacific Coast agents: Open the valve *H* in the suction pipe full, also the valve *D* in the steam pipe, and in a short time the water will appear at overflow. Then gradually close the valve *H* in the suction pipe *I*, and the water will stop at overflow when the injector will be working. As steam rises, the valve *H* can be gradually opened until the injector takes all the water. Where this variation of steam used is not over 40 pounds after the valve *H* is once set, it is only necessary to turn steam on and off and the injector will start automatically. A leak at the overflow is caused by too much or not enough water, or a leak in the suction pipe. When a long lift is used, it takes several minutes to bring the water to overflow.

Now the borax fields here and in Nevada are extensively worked. Prices in 1872 were 32 cents per pound; now they are 5½ and 6½ cents. The borax now worked occurs mainly as a borate of lime, or as an efflorescence on the surface. The soil is leached in large vats, and the borax purified by settling and subsequent slow crystallization. The borax market is now controlled by San Francisco merchants.

Roasting and Leaching of Silver Ores.

Notes of the Practice at Las Yedras, Sinaloa, Mexico.

NUMBER 3.

[Written for the Press by CARL A. SCHENCK.]

The operations in the leaching department separate themselves into four distinct groups:

1. The leaching of the roasted ore in the leaching vats.
2. The precipitation of the silver-sulphids.
3. The return of the regenerated hypo to the elevated and storage vat.
4. The work of the cleanup, including the transfer of the precipitates to draining vats, roasting of the same and preparation for shipment.

Construction of the Vats.

Of the ten vats put up for dissolving the silver, five are round, built of wood, and the other five rectangular, constructed of masonry, with a capacity of about 30 tons to a vat of each kind. The diameter of the round vats is 16 feet and the depth six feet, of which six inches are used for the rock bottom; the inside dimensions of the rectangular vats are about 15½x17x5½, which latter is the depth to the surface of the rock bottom. A framework of wood and iron rods—the rods being laid in the walls, and passing from upright to upright, being also provided with nuts for adjustment—strengthens and stiffens the brickwork of the rectangular vats. The thickness of the proper wall is equal to two bricks in length, so that it is made up of two shells, each one brick length in thickness and the inner shell put up close to the outer, a thin plaster of brickdust coated over with tar intervening only between the two. To the surface of the inner shell the same plaster and coating of tar is applied, upon which follows a covering of half-inch boards, with the joints running up and down. Planks, held in position by nuts which are screwed to the ends of perpendicular rods laid in the masonry, cover the top of the walls of this square inclosure. The brick floor is made impervious in a similar way, and the whole structure rests solidly on the natural rock foundation. The wooden vats are built of two-inch staves cut out of the native pine, which is of a very inferior quality. They are also coated on the inside with tar. For the purpose of filtering, a rock bottom about six inches thick is used, which, in comparison to a properly constructed false bottom, does not answer so well as the latter, which point will be referred to further on.

Leaching of the Roasted Ore.

By means of a system of tracks, consisting of main tracks, turntables and side tracks, the ore is conveyed in cars from the roasters, charged into the vats and the tailings wheeled to the dump pile. From the main pipes for water and hypo, running parallel to the line of vats, are connections with proper valves, so that each vat has its own hypo connection, and between each pair of vats a short pipe runs off from the water main. By coupling rubber hose to these short connections, one or two streams of water can be turned on and led into any one vat, whenever it is necessary. Solutions are drawn from the bottom by means of two-inch rubber pipes, which, when not in use, are hung up; though this diameter appears rather large, experience has shown that it is not too large for quick filtration, the same amount of hypo running in at the top. The outflow can be, moreover, regulated by clamps, so that the surface of the ore under treatment may always be well covered with hypo, even in case of a diminished supply; for instance, by drawing off more than two streams from the main hypo pipe at a time.

Of the round vats, only one, No. 2, is used at present; but the rectangular brick tanks 4, 5, 6, 7 and 8 are all in use and answer the purpose well.

[TO BE CONTINUED.]

Appreciative.

THE MINING AND SCIENTIFIC PRESS of San Francisco has entered Volume LIV. We think that paper fills the bill as a promoter of the great industry of mining. That paper covers the entire field. For our use we don't ask a better mining paper than the MINING AND SCIENTIFIC PRESS of San Francisco.—*Foothill Tidings*.

W. J. Freeman, agent for the San Francisco MINING AND SCIENTIFIC PRESS, was in town Tuesday last in the interest of that most excellent periodical.—*North San Juan Times*.

MECHANICAL PROGRESS.

The Principle of the Injector.

The *Journal of the Brotherhood of Locomotive Engineers* contains several answers to the question, "Why does an injector work?" The following contributions are specimens of tolerably correct and wholly erroneous solutions of a problem which for many years puzzled the engineering world:

"All injectors work mainly on the same principle. The resistance of pressure in boiler, weight of check valve and friction of pipes are overcome by the momentum imparted to the water by the steam at the point where the steam suction and discharge pipes combine. In order to attain the necessary velocity, the water must come through the suction pipe cold enough to condense the steam immediately when they come in contact with each other, thereby giving the steam a solid body of water to act on, and allowing it to exert all its force in one direction. If the water be so hot as to not immediately condense the steam, then the steam would occupy space in the discharge pipe, and would naturally exert a pressure in both directions, thereby breaking the stream, and would force the water back through the suction pipe, even though the water is cold. If the quantity supplied is not sufficient to condense the steam, the injector will not work."

Another contributor says:

"Now as to my belief as to what makes the injector operate, I think in no way can I explain it better then by comparing it to a shot-gun (now don't laugh, but read and see if it doesn't strike you that way; I mean the idea, not the gun), in which steam is the powder and water the shot. If we shoot a gun loaded simply with powder, the smoke of the discharge passes but a little way from the muzzle; but put in a few shot and they are propelled hundreds of feet; place a board near and they will go right through it. The secret of their penetrating force is their weight. 'The force of the momentum of any body is in proportion to its weight.' See? And that explains why the injector does not work hot water. The nearer to steam that water becomes, the lighter it is, until it is so light that it will not have weight enough to give it the force necessary to lift the check valve that is fired against by the powder steam."

"It is the momentum of the water fired out of the nozzle of the steam-jet that gives the penetrating power, and the more solid the water is, the more power it will have with the same velocity; the nearer steam the water is, the less will be its force, and consequently the injector will not work hot water, or water much above 150°."

It need not be said that the reasoning of the second contributor is wholly erroneous. The fact that steam from a boiler will not only re-enter that boiler after passing through several pipes, contracted passages and valves, but will carry a considerable body of water with it, will always be an apparent paradox, and it is not surprising that locomotive engineers should be a little uncertain as to the exact explanation.

The action of an injector may, however, be easily explained. High-pressure steam moves with an immense velocity, steam of 140 pounds pressure above the atmosphere being capable of going into the atmosphere at the rate of 1917 feet per second, or 1302 miles per hour, which is sufficient to impart a moderate velocity to a body heavier than itself. In an injector that body is the feed-water. Unless, however, the feed can condense the steam, the injector will not work. The reason is apparently purely mechanical, as the steam, being bulky and highly elastic, can have no appreciable effect in driving the particles of water in any given direction. When, however, the steam is condensed into an unelastic jet of water, still moving at a great velocity, it forces the feed-water before it into the boiler. This is easily illustrated by supposing that an attempt were made to propel a ship by a jet of compressed air from the stern. The air would simply rise in a mass of foam to the surface, and the energy in the air would be wasted in spray instead of propelling the ship. A jet of water, however, directed astern, would have no tendency to rise, as there would be no difference of specific gravity, and it would therefore propel the ship by reacting against the mass of water.

It is somewhat singular that there has been so little theoretical discussion of the injector, accompanied by formulae giving the quantities of water of a given temperature which should be delivered per hour by an injector of a given size, working with a given pressure of steam. Some empirical formulae exist, based on the result of experiments, but such as are based on pure reasoning from the recognized laws of physics seem to be very little known.—*Railroad Gazette*.

OLD HORSESHOES—HOW THEY BECOME VALUABLE.—The wrought iron, of which horse-shoes are made, owing to the constant hammering on pavements, stones, and hard roads, together with the animal heat to which they are constantly subjected, gradually assumes the hardness of steel, combined with great malleability and elasticity—qualities which eminently fit them for being manufactured into fine articles of cutlery, such as knives and sword blades. Horseshoes in this country, especially, are always separated from the promiscuous mass of iron scrap and reserved for special uses. They

are considered much superior in value to ordinary iron. It is said that the peculiar value of old horseshoes does not seem to be appreciated in Germany and other European countries, and that John Chinaman, having learned the secret of their value, is now largely engaged in buying them up and shipping them from Germany to China. A Berlin firm recently shipped, to Chinese order, between 3000 and 4000 tons of this cast-off equine wear. They will be used in the manufacture of superior Chinese cutlery.

IS IT A CURSE?—In 1840, says the *Age of Steel*, when there was no wood-working machinery worth mentioning in use, one person out of every thousand was a cabinet-maker or upholsterer. In the 10 years following, wood-working machinery came largely into use. Now, if machinery is a curse to the mechanic, it must be because it deprives him of work or reduces his wages. But neither of these conditions followed the introduction of machinery; on the contrary, in 1850, in a population of 23,191,000, there were 23,522 furniture-makers, or one to every 985 people; and annual earnings had advanced 20 per cent. In 1860 the proportion of furniture-makers to population was the same as in 1850, but during the 10 years wages had advanced so that whereas the mechanic (averaging all classes, including children) in 1850 earned \$298 per year, in 1860 he was earning \$327. Bringing the comparison down to the year 1882, the number of operatives had increased to one in 657 of population, and the average annual earnings of each operative had increased to \$434.70. Of food products, a dollar will purchase as much now as it would in 1840, and a very much greater quantity of manufactured products; so the difference in annual earnings between 1840 and the present, considered relatively to its value—that is, its purchasing power—is enormous. It therefore appears that, as the use of machines has multiplied, the demand for operatives in the furniture industries has increased, and the annual wages have also increased about three-fourths.

FLUE DUST.—The importance of close attention to details and to a full understanding of the qualities of the material to be treated is fully shown in the item of flue dust alone, in which a large waste, often unknown and unaccounted for, takes place. When appliances have been used, after attention was called to years of loss and wastefulness in this direction, the results are astonishing. Recently the furnaces of the Anaconda mines, of Montana, were started up on flue dust, of which 600 tons had been collected, carrying a large percentage of valuable material. Upon this topic the *Leadville Herald Democrat* states that an analysis of many thousands of tons of flue dust showed its composition in that locality to be as follows: Silver, from 20 to 37 oz. per ton; lead, from 20 to 30 oz. per ton; gold, from a trace to $\frac{1}{2}$ of an oz. per ton; zinc, from $\frac{1}{2}$ to 9 per cent; arsenic, from a trace to $\frac{1}{2}$ per cent; silica, from 18 per cent to 27 per cent, and iron, from 11 per cent to 25 per cent. These facts are sufficient to show one of the sources of large loss in ore treatment.

CASTING IRON OR STEEL UPON BRASS.—One of the latest inventions or discoveries in metallurgy is the casting of iron or steel on brass. It is a thing that has often been sought to accomplish, but until recently without success. Experiments were made lately in Boston. The brass core, or whatever it may be, is first cast in the usual way, and is then molded in conjunction with the pattern, and when the latter is removed it is allowed to remain in the flask, and the melted iron poured over it. This iron is prepared by a flux for ready amalgamation with the brass, and when the compound casting is taken from the sand it is found to be a complete and well-connected piece. The union of the two metals is perfect, and they can be separated by melting the brass which runs at lower temperature than iron from its backing. For bearings for car axles and other things that now require solid and thick brass castings, costing quite heavily by the pound, the compound bearings, being more than three-quarters cheap iron, would form a cheap and efficient substitute.

IRON AND STEEL TOOLS.—It is difficult, says a Belgian journal, to distinguish between iron and steel tools. They have the same polish and workmanship; use will commonly show the difference. To make the distinction quickly, place the tool upon a stone and drop upon it some diluted nitric acid (four parts of water to one of acid). If the tool remains clean, it is of iron; if of steel, it will show a black spot where touched with the acid. These spots can be easily rubbed off.

TO SOFTEN COPPER WIRE.—Copper or brass wire larger than No. 18 is hard to bend. By heating to redness and plunging into cold water both these metals will become much softened. In making joints in wires before soldering, if they are softened in this way and cleaned, excellent contact apart from the solder can be obtained.

THERE are but two rolling mills in the State which turn out steel rails. These are the Pacific Rolling Mill, in this city, and the Central Pacific Railroad Rolling Mill, at Sacramento. The Judson Rolling Mill Company, whose works are at Oakland, turn out no steel rails, confining its attention to agricultural implements and other hardware.

SCIENTIFIC PROGRESS.

Subterranean Atmosphere.

Mr. R. Norton communicates to the *Scientific American* some very interesting facts in regard to subterranean atmosphere, as follows:

The largest volume of subterranean atmosphere with which we are acquainted is found in Mammoth Cave, Ky. This cave, or rather system of caves, is very extensive, greatly exceeding the other two notable caverns in our country—the Luray of Virginia and the Wyandott of Southern Indiana. The passageways of Mammoth Cave have a combined length of over 150 miles, and their area covers hundreds of acres. It is estimated that the entire volume of atmosphere thus inclosed exceeds 12,000,000 cubic yards. In this underground world the ordinary atmospheric changes are unknown, summer and winter are unknown, and the heat of the sun never reaches its unbroken night.

Like all our larger caverns, the temperature is alike at all times and seasons. In the summer there is a brisk outward current having a temperature of 53° to 54°. This current is doubtless fed by certain leakages of air which filter through the sinkholes, which discharge their moisture at certain points in the cave system.

In the winter there is a current of air setting inward. This is not perceived at a distance of one-fourth of a mile from the entrance. It nevertheless depresses the thermometer a few degrees, and its effect upon the humidity of the air is evident at the distance of three-fourths of a mile.

For the first time hygrometric observations have been carefully made as to this unique body of atmosphere. The dryness of the air has often been noticed, and the resultant miter heads were esteemed a matter of national importance during the war of 1812.

In the "Gothic Gallery," several miles underground, visitors have been wont to deposit their cards, and these cards have remained for years, fresh as new, save where moist finger prints have left behind them the germs of mold. The ground is seemingly dusty, but still the dust, if stirred, will not rise in the air, nor soil a polished shoe. In these portions of the cave, which seemed destitute of moisture, the wet and dry bulbs of the hygrometer showed the same figure, the variations seldom exceeding one-fourth to one-half a degree. The humidity ranged between 96 and saturation. With the thermometer at 54°, the wet bulb would range between 53° and 54°, and the dew point would be between 53.1-10° and 53.7-10°. The singular fact was noted that the same temperature prevailed at the roof as upon the floor of the cave; and where differences of 200 to 300 feet of elevation occurred, the thermometer would be depressed one or two degrees at the higher as compared with the lower altitude. The humidity would, however, remain a constant quantity. This can be accounted for only on the supposition that the supply of air, slowly admitted from above, is chilled by the absorption of moisture during the first stages of its descent, and becomes slowly warmed before completing its full descent of 300 feet. Mold is rarely seen in the cave, but wherever it occurs a snowy whiteness and luxuriance of growth are noted.

One avenue is devoted, with excellent success, to the growth of mushrooms, and no doubt such an atmosphere might have an industrial value for other purposes.

Several consumptives once tried to live, and get well, in the cave. But the result was disastrous. The lack of light was, no doubt, one reason of this; but the hygrometric condition of the air, of which nothing was then known, by greatly retarding healthy perspiration, doubtless hastened the fatal result.

Photographic Astronomy.

Prof. Pickering, of Harvard University, recently read a very interesting paper on photographic astronomy before the Boston Institute of Technology. He alluded briefly to the history of this important branch of that science. Prof. Bond, of Harvard, was the first investigator in this interesting field. His son, Prof. Geo. F. Bond, and Prof. Winlock afterward took up and carried on the work at Harvard. Prof. Pickering is now in charge.

The use of photography in the study of astronomy is comparatively a recent innovation, but it is making steady and rapid strides in the advancement of the science, particularly in the study of the stars and nebulae. Stars are now photographed which cannot possibly be seen with the naked eye, and some have been discovered, by photographic means, whose existence could not have been made known by the most powerful telescopes.

In photographing a fixed star, it is necessary, in order that the star may appear in the negative as a point only to have the telescope move with the same angular velocity as the earth. This motion is imparted by clockwork, driven and regulated by electricity, which is the most perfect clock movement which has been devised. When no clockwork is attached to the telescope the stars appear as so many lines instead of points.

An interesting use of this mode of photographing the stars has been made in causing the heavens to register themselves on the same plate by means of dots and dashes. This effect is produced by shutting off the light at inter-

vals. Many widely separated stars are thus photographed on the same plate, and the danger of mistaking one set or group for another is avoided.

When the clockwork is put in, all the light of the stars or "lines" becomes concentrated in points.

The professor referred to useful results which had been obtained by photographing Jupiter's satellites; also in the recently discovered nebulous cluster in the group of the Pleiades and the nebula of Orion.

In the study of the spectra of the stars, photography has proven a most important aid. By this means the group of the Pleiades has been conclusively proven to be composed of the same or similar material; the few stars in the vicinity which showed a different composition, being the very ones which have been decided by heliometer measurements to be separate from the group. By the same means remarkable varieties in the spectra of the different stars, hitherto not known, have been found to exist.

The late Prof. Draper gave much time to this study, and his widow has presented to the observatory his fine telescope specially adapted to such work. In getting the spectra of heavenly bodies by this instrument, four immense prisms are used to give the proper dispersion, and it is expected as this branch of the science advances that the investigation now made possible will disclose not only the composition but possibly the temperature of the scintillating spheres. The fact whether certain stars are approaching or receding from the earth, will, it is expected, be made more conclusive and such observations be also much extended. Many other important revelations are looked for by the further study and exercise of this new astronomical aid. The paper of the professor was listened to with great interest by the very intellectual audience present.

It may be remarked in this connection that much may be expected in this direction from the Lick Observatory in this State, when work there is fully under way. The exceptionally clear atmosphere on Mount Hamilton, far exceeding in that particular any other observatory in the world, cannot fail to give greatly added efficiency to the photographic study of the myriad of other worlds above and about us.

METEOR SHOWERS.—Prof. Richard A. Proctor maintains that most of the meteor streams with which the earth comes in contact are derived from the earth itself; that is, thrown off by volcanic action at a time when the internal forces of our planet were sufficiently active to give the initial velocity, some 12 miles a second, requisite to carry them beyond the earth's attraction. Comets, which he regards as the parents of the meteor streams, he thinks may have originated outside our solar system. Most of the comets whose orbits belong to our system, he thinks originated in the larger planets. The sun is now, perhaps, giving birth frequently to comets which probably pass beyond the limits of its attraction.

A SENSITIVE COMPASS.—The *Orizaba*, of New York, is a new steamer. The compasses are Sir William Thompson's patent. When swinging the ship, the reading of the bearings by one of the officers was always different from that by other officers. This led to a wordy contention, the officer maintaining that his reading was correct. The difference was at last discovered to be due to that officer having on a steel truss. These compasses are so sensitive that they are affected by such very minute disturbing influences. The officer had to go on shore and provide himself with a truss constructed free of iron.

DISCOLORATION OF GLASS.—The discoloration of glass by the action of sunlight is very decided. It is found that nearly every kind of glass, especially that containing manganese, is liable to change of color by the action of sunlight; but the glass can be restored to its original color by heat. In our cathedral windows the glass is not of its original colors, but these colors can be brought back again by heat.

THE COLOR OF THE "BUTTERCUP."—The peculiar varnish-like luster of the petals of the buttercup is attributed by Dr. Mobius, who has recently been investigating it, to a highly refractive yellow oil existing in the epidermal cells, increased by the fact that the layer of cells of the mesophyll is densely filled with minute starch grains.

A LARGE MULLIN.—*La Nature* has recently figured a remarkable specimen of the common mullin (*Verbascum thapsus*), which was found growing in a garden near Rouen, and the dimensions of which were as follows: height, 10 feet 1 inch; raceme of flowers, 5½ feet in length; leaves on an average, 1 foot wide by 2 feet in length.

THE MOUND-BUILDERS.—Recent explorations prove that the ancient mound-building inhabitants of America extended their works northward beyond the Red river of the North. Along this river and Lake Winnipeg were found mounds identical in structure with the famous ones of the Ohio and Mississippi valleys.

SKELETON OF A WHALE ON A MOUNTAIN-TOP.—The petrified skeleton of a whale over 30 feet long has been discovered by an officer of the Coast Survey on a range of mountains in Monterey county, Cal., over 3300 feet above the sea level.

The New State Government.

State Officers.

Governor.....	WASHINGTON BARTLETT
Lieutenant Governor.....	R. W. WATKINS
Secretary of State.....	WM. C. HENDRICKS
Comptroller.....	JOHN P. DUNN
Treasurer.....	ADAM HEBBOLD
Attorney General.....	CHAS. A. JOHNSON
Superintendent of Public Instruction.....	JOHN G. HOLT
Surveyor General.....	THOMAS RICHMOND
Clerk of Supreme Court.....	J. D. SPENCER
Associate Justices (short term).....	JACKSON TEMPLE
Justices of Supreme Court (long term).....	T. B. MCFARLAND
Justices of Supreme Court (long term).....	A. VAN R. PATTERSON
Justices of Supreme Court (long term).....	A. ABBOTT
Justices of Supreme Court (long term).....	J. W. WEAVER
Justices of Supreme Court (long term).....	J. W. WEAVER
Justices of Supreme Court (long term).....	GORDON F. SLOAN
Justices of Supreme Court (long term).....	L. C. MCKENHUSE
Justices of Supreme Court (long term).....	C. E. WILCOX
Justices of Supreme Court (long term).....	JOHN T. GAFNEY

Senators.

DIST.—NAME.	COUNTY AND POST OFFICE.
1—John P. Haynes, D.....	Humboldt, Del Norte, Eureka
2—M. K. Rice, D.....	Trinity, Siskiyou, Shasta
3—W. H. Patterson, R.....	Modoc, Lassen, Plumas, Sierra
4—Albert F. Jones, D.....	Butte..... Oroville
5—A. Walrath, R.....	Nevada..... Nevada City
6—A. Yell, D.....	Mendocino, Lake..... Ukiah
7—A. P. Hall, R.....	Placer, El Dorado..... Penryn
8—John Rogers, D.....	Colusa, Tehama..... Princeton
9—H. C. Gifford, D.....	Colusa, Yuba..... Colusa
10—E. C. Hinchshaw, D.....	Sonoma..... Petaluma
11—James McCadden, D.....	Solano..... Vallejo
12—L. A. Chandler, R.....	Yuba, Sutter..... Nicolaus
13—F. R. Dray, R.....	Sacramento..... Sacramento
14—A. Caminetti, D.....	Amador, Calaveras..... Jackson
15—J. P. Abbott, R.....	Marin, Contra Costa..... Martinez
16—P. J. Moffitt, D.....	Alameda..... Oakland
17—Henry Vrooman, R.....	Alameda..... Oakland
18—M. W. Dixon, D.....	Alameda..... San Jose
19—John Lenahan, D.....	San Francisco..... 151 Tehama
20—Thomas J. Pinder, D.....	San Francisco..... 321 Broadway
21—J. J. Sullivan, D.....	San Francisco..... 936 Shotwell
22—J. N. E. Wilson, R.....	San Francisco..... Old City Hall
23—P. J. Crimmins, R.....	San Francisco..... 45 Ritch
24—J. Murphy, D.....	San Francisco..... 29 Russ
25—J. J. McCarthy, D.....	San Francisco..... 1123 Folsom
26—T. H. McDonald, D.....	San Francisco..... State P. Office
27—T. J. Clunie, D.....	San Francisco..... 830 Turk
28—L. Spillacy, D.....	San Francisco..... 2529 Bryant
29—B. F. Langford, D.....	San Joaquin..... Lodi
30—A. J. Meaney, D.....	Merced, Stanislaus, Tuolumne
31—A. W. Randall, R.....	Santa Clara..... San Jose
32—E. B. Conklin, R.....	Santa Clara..... San Jose
33—J. D. Byrne, R.....	San Mateo, Santa Cruz, S. Mateo
34—G. G. Goucher, D.....	Alpine, Mariposa, Mono, Fresno
35—B. V. Sargent, D.....	Monterey, S. Benito, Monterey
36—John Roth, D.....	Tulare, Kern..... Traver
37—George Steele, R.....	S. L. Obispo, S. Barbara, Ventura
38—S. M. White, D.....	Los Angeles..... Los Angeles
39—J. J. Rose, D.....	Los Angeles..... San Gabriel
40—W. W. Bowers, R.....	S. Bernardino, S. Diego, S. Diego
Total Democratic Senators.....	26
Total Republican Senators.....	14

Assemblymen.

DIST.—NAME.	COUNTY AND POST OFFICE.
1—R. H. Campbell, R.....	Del Norte, Siskiyou..... Ferndale
2—George Williams, R.....	Humboldt..... Eureka
3—J. F. McGowan, R.....	Humboldt..... Eureka
4—W. H. Shaughan, D.....	Trinity, Shasta..... Anderson
5—W. D. Morris, D.....	Modoc, Lassen..... Lookout
6—R. H. Varley, R.....	Plumas, Sierra..... Quincy
7—W. P. Matthews, D.....	Tehama..... Tehama
8—Allen Henry, D.....	Butte..... Chico
9—L. C. Granger, D.....	Butte..... Oroville
10—T. J. Hart, D.....	Colusa..... Colusa
11—H. Handy, R.....	Mendocino..... Covelo
12—L. H. Gruwell, D.....	Lake..... Lower Lake
13—George Ohlleyer, D.....	Sutter, Yuba..... Yuba City
14—Joseph Sims, D.....	Nevada..... Nevada City
15—John I. Sykes, R.....	Nevada..... Grass Valley
16—John Davis, R.....	Placer..... Rocklin
17—Henry Mahler, D.....	El Dorado..... Coloma
18—W. Carroll, R.....	Sacramento..... Sacramento
19—L. S. Taylor, R.....	Sacramento..... Sacramento
20—Seymour Carr, R.....	Sacramento..... Clay Station
21—L. E. Adams, D.....	Yolo..... Knight's Landing
22—F. L. Coombs, D.....	Napa..... Napa City
23—G. W. Morgan, D.....	Sonoma..... Fort Ross
24—W. J. Hotchkiss, D.....	Sonoma..... Windsor
25—J. McDonnell, Jr., R.....	Sonoma..... Sonoma
26—Frank O'Grady, D.....	Solano..... Vallejo
27—Robert J. Curry, R.....	Solano..... Dixon
28—J. W. Atherton, R.....	Marino..... Novato
29—James B. Brown, R.....	San Francisco..... 14 Willows Ave
30—James Burnett, R.....	San Francisco..... 144 Second St
31—Edwin Lewis, D.....	San Francisco..... 546 Mission
32—M. Lawrence, D.....	San Francisco..... 608 Powell
33—J. Callaghan, D.....	San Francisco..... 921 Natoma
34—Michael H. Barry, R.....	San Francisco..... S. Glover
35—J. H. Colbert, D.....	San Francisco..... 450 Third
36—C. F. Curry, R.....	San Francisco..... 334 Clementina
37—Thomas M. Seary, D.....	San Francisco..... 4363 Clementina
38—Daniel S. Regan, D.....	San Francisco..... 540 Stevenson
39—James E. Britt, D.....	San Francisco..... No. 3 H & L Fire Dept
40—Andrew J. Martin, R.....	San Francisco..... 144 Polkman
41—Henry R. Mann, D.....	San Francisco..... 3004 Sacramento
42—John LaBlanc, R.....	San Francisco..... 1721 Devisadero
43—Luther L. Ewing, R.....	San Francisco..... 1601 Turk
44—Richard Cohen, D.....	San Francisco..... 103 Ridley
45—William A. Brown, R.....	San Francisco..... 2306 Mission
46—Hugh Toner, D.....	San Francisco..... 608 Third
47—Thomas Mitchell, D.....	San Francisco, Cor Utah & Yolo
48—Joseph Winrow, R.....	San Francisco, Recorder's office
49—W. Z. Price, R.....	San Mateo..... San Mateo
50—Jesse Cope, D.....	Santa Cruz..... Santa Cruz
51—Hiram Bailey, R.....	Alameda..... Livermore
52—John Ellsworth, R.....	Alameda..... Alameda
53—M. D. Hyde, R.....	Alameda..... Oakland
54—F. M. Cooley, R.....	Alameda..... Oakland
55—W. H. Jordan, R.....	Alameda..... Oakland
56—C. O. Alexander, R.....	Alameda..... Oakland
57—D. N. Sherburne, R.....	Contra Costa..... Danville
58—J. D. Young, D.....	San Joaquin..... Stockton
59—J. R. Henry, D.....	San Joaquin..... Linden
60—J. C. Bruse, R.....	Amador..... Ione
61—F. W. McElanahan, D.....	Calaveras..... Milton
62—Edward Smythe, D.....	Tuolumne..... Sonoma
63—A. Wilcox, R.....	Santa Clara..... Santa Clara
64—M. Weber, R.....	Santa Clara..... Santa Clara
65—Samuel Rucker, R.....	Santa Clara..... Santa Clara
66—C. C. Wright, D.....	Stanislaus..... Modesto
67—J. W. Boot, D.....	Merced, Mariposa..... Merced
68—J. H. Matthews, D.....	San Benito..... Hollister
69—Thomas Runson, D.....	Monterey..... Gonzales
70—J. Vincent, R.....	Fresno..... Fresno City
71—B. Butler, R.....	Tulare..... Grangeville
72—A. J. Gould, R.....	Alpine, Mono, Inyo..... Darwin
73—McD R. Venable, D.....	San Joaquin, S. E. Obispo..... San Joaquin
74—Russell Heath, D.....	Santa Barbara..... Carpinteria
75—J. Marion Brooks, D.....	Kern, Ventura, S. Buena Ventura
76—J. R. Brierly, R.....	Los Angeles..... Los Angeles
77—C. W. Knox, R.....	Los Angeles..... Los Angeles
78—W. H. Spurgeon, D.....	Los Angeles..... Santa Ana
79—Hiram M. Ron, D.....	San Bernardino..... San Bernardino
80—Nestor A. Young, R.....	San Diego..... Mesa Grande
Total Democratic Assemblymen.....	41
Total Republican Assemblymen.....	39

Majority Republican, 2.

Democratic majority on joint ballot..... 10

USEFUL INFORMATION.

COMPOSITION TO ATTRACT DISSOLVED CRYSTALS.
—One of the greatest objections to all processes heretofore used for the purpose of crystallizing the surface of fancy goods has been that the crystals soon become loose and drop off, and on this account crystallized decoration has not been introduced in as great a degree as it would have been if some method had been discovered for holding the crystals firmly in position. Mr. William Kornacher, of Scranton, Pa., has lately been experimenting with various materials for quickly producing crystallization for decorative purposes, and has discovered a new process by which crystals are more quickly and perfectly formed and are more firmly attached than by any method yet introduced. This discovery consists in the use of a base which can be molded into any desired shape, and which is so treated that when immersed in a crystallizing solution, the crystals will form very rapidly and make a positive connection with the base, and thus insure a stability that will fulfill all the requirements of the trade, in articles that are decorated in this manner. This invention is of importance, since this method of covering the surface of fancy articles is very beautiful. The crystals can be made of any desired size, and if the article to be treated is made of a number of pieces, each having crystals of a different color, effects can be produced that cannot be attained in any other manner.

HOW HORSES REST is explained by the New York Mail and Express as follows: "Horses can get some rest standing," said an old trainer, recently, "provided the position is reasonably easy, but no full rest except when recumbent. It is known of some horses that they never lie down in the stall, though when in pastures they take their rest habitually in a recumbent position. It is well to consider whether the habit has not been forced upon the horse by some circumstances connected with the stall he was compelled to occupy, in that he had a muddy earth floor or one made of dilapidated plank, uncomfortable and offensive to the horse that had been accustomed to select his own bed in the pasture. If the horse can have the privilege of selecting his own position for resting on his feet, he can sleep standing; but while his muscles may be to a certain degree relaxed, and get rest in that position, what can be said of the hearings at the joints? Without relief through the recumbent position, the joint surfaces are forced continuously to bear a weight varying from 1000 to 1800 pounds. This must act unfavorably, especially upon the complicated structures within the hoofs, which Nature intended should have periods of rest each day."

FOR CLEANSING AND WHITENING INSIDE WALLS.—Ordinary whitening is not altogether the best thing to put upon inside walls. A mixture that has a whitening and sweetening effect and which is also cheap and durable, may be made as follows: To 15 pounds of the best whiting, thinned down to proper consistency in cold water, add one pound of clear white glue dissolved in warm water. Apply cold, except in cold weather, when the walls are all cold, in which case it is well enough to use some warm water, enough to keep the mixture thin so that it will spread easily. Dissolve the glue, first cover it with cold water, and let it stand and soak until it becomes soft; then pour off the cold water and add hot water; it will then readily dissolve. For very fine work, it is recommended to use zinc white instead of whiting. Half an ounce of ultramarine blue added to the above makes a clearer white. The mixture may be colored, if desired, to suit before putting in the glue.

DRESS COATS AND VESTS COMBINED.—A recent London paper says: Everybody who has to get into a dress coat knows the difficulty of preventing it from swinging away at the waist or collar, or slipping off the shoulders. These apparently irremediable defects—irremediable because the coat cannot be buttoned—have, I find, been completely overcome by well-known coat tailors of Bedford street, Strand, by attaching the waistcoat to the coat in a very simple manner. Thus, when the vest is buttoned the coat for all practical purposes is also buttoned. Moreover, the latter then clings to the figure as closely as a frock coat and remains in the same position, imparting an appearance of smartness about the waist especially, which in a dress suit is really of the utmost importance to the wearer. I have no doubt that the dress coat and vest combined will be very popular during the present season.

A CONVENIENT MEASUREMENT.—To find the capacity of a tub having the shape of a truncated cone, add to the square of the larger radius the square of the smaller radius, and the product of the two radii; multiply the sum by the height and the product by 7.8, which will give the contents in gallons.

CRUSHING RESISTANCE OF BRICK.—It is said hard burned brick walls will resist a pressure of 150 pounds per square inch, and can therefore be built 1600 feet high. If one-third Portland cement is added to the mortar, the same wall could be built 2700 feet high.

THE SEVERN TUNNEL.—The total length of the Severn tunnel is 4 miles 624 yards; the St

Gothard tunnel is 9½ miles; Mont Cenis tunnel, 7½ miles; Arlberg tunnel (Austria), 6½ miles; the Hoosac tunnel, in Massachusetts, 4½ miles; the Standage tunnel, on the London & Northwestern, is 3 miles long, and the Box tunnel rather less. But the special feature of the Severn tunnel lies in the fact that 2½ miles of it have been constructed from 45 feet to 100 feet below the bed of a rapidly-flowing tidal estuary, offering engineering difficulties which make it the most remarkable tunnel in the world.

COPPER COVERED WITH STEEL.—A telegraph wire is now being brought out in England in which the steel is made to surround the copper. The wire is said to be drawn from compound metal, consisting of a hollow ingot of steel filled with copper.

OILCLOTH may be improved in appearance by rubbing it with a mixture of a half-ounce of kerosene in a saucerful of turpentine. Set this in a warm place until they can be thoroughly mixed. Apply with a flannel cloth, and then rub with a dry flannel.

WATER IN LEAD PIPES.—It has been clearly established that lead pipes are little affected by water if constantly filled, but readily affected if alternately filled and emptied. Unless always full they are not fit for carrying drinking water.

RAILROAD GAUGE IN THE SOUTH.—The gauge of all the railroads in the South is to be changed this spring to the standard—4 feet 8½ inches. The gauge of most of the Southern roads was changed to the standard width about a year ago.

TO SOFTEN WROUGHT IRON, first heat it until it becomes a low red color, and cool it in soft soap. Reheat it to a low red as before, and let it cool in limo. It is said that this treatment makes the iron very soft.

PAPER FROM PALMETTO.—A ton of palmetto is to be sent north from Sanford, Fla., to be manufactured into paper as a test of that material for printing paper.

PATENT LEATHER.—To prevent patent leather from cracking, always warm the leather before inserting the foot in the shoes. Heat renders patent leather soft and pliable.

A HANDY PEN-WIPER.—A good pen-wiper for steel pens is a piece of raw potato. It removes the ink crust and causes a smooth flow of ink.

SAN FRANCISCO is the ninth city of the Union in point of population.

GOOD HEALTH.

Lanolin—A New Oil.

Lanolin is the name given to a new fatty substance obtained from the alkaline water-wastings of wool, and very highly recommended as a base for various medicated salves and ointments used in treating cutaneous eruptions and other external as well as internal disorders. It consists of varying proportions of cholesterol and fat acids, with which is incorporated a certain percentage of water, which it readily absorbs, thus forming a smooth, white, unctuous mass. As some of our professional readers will be interested to know how it is prepared, we are able to present the following formula, as contained in a late issue of the *Western Drug-gist*:

"The wool-washings are first passed through a fine sieve to free them from mechanical impurities, and then through a convenient quantity of cut straw or sawdust; the solution is then treated with magnesium sulphate, and the resulting magnesium soap, containing also the cholesterol, is collected, well washed with water, then drained and allowed to dry by exposure to air. It is then treated with sufficient diluted hydrochloric acid to decompose the soap; a large excess of hydrochloric acid should be avoided, but sufficient added until a slight excess of acid is indicated, which is afterward removed in the process. The resulting fatty scum, consisting of fatty acids and cholesterol, is drained and treated with petroleum benzine in a closed vessel, slightly warmed to about 85° F. to aid solution, and then filtered through flannel in a closed filter press. The petroleum benzine is then driven off by evaporation or distillation, and to remove any remaining traces of hydrochloric acid, the residue is treated with from one-tenth to one-fourth per cent of carbonate of magnesia, rubbed up with water, the mixture being then well washed with fresh portions of water, until the water washings are no longer milky. It is then again melted, filtered, while hot, through flannel, and, when cold, water is incorporated, and the lanolin becomes white, hard and smooth."

The peculiar valuable quality of lanolin consists in this facility with which it penetrates the skin and is absorbed into the system. This peculiar characteristic makes it especially valuable as a carrier. There is no doubt but that gray ointments, and in fact all ointments, are much more efficient when prepared with lanolin. When used on mucous surfaces it never forms a scab.

THE VERTIGO OF THE KAJAK.—Mr. Hastrup, a physician of North Greenland, has observed a curious affection that attacks the Esquimaux.

Its name in the Esquimaux vernacular is the equivalent of our term "boat fright," but Danish physicians call it "Svimmelhed i Kajak," or vertigo of the kajak. The disorder is described as follows: An Esquimaux, while sailing in his kajak upon a perfectly calm, smooth sea, is suddenly seized with a feeling that his boat is tipping to one side. His jumps to the other side to preserve the equilibrium, but this only makes matters worse, and he abandons himself to anxious and even frenzied attempts to keep the boat from tipping. He can no longer fish, and his trouble does not cease until he gets in sight of shore or of another boat. These attacks are not accompanied or preceded by any malaise or nausea. There does not appear to be any true vertiginous sensations, but there is rather an hallucination of the sense of equilibrium. The disorder attacks the Esquimaux when they are apparently in full health, and it is not accompanied with headaches, tinnitus, palpitations, convulsions or paralysis. It may last a lifetime, or go away as it comes, quite suddenly. It is a great misfortune to the patient, since he can no longer fish, and is practically an unproductive member of society. The disease has been attributed to the excessive use of coffee and tobacco, but Mr. Hastrup has observed it in men who used neither of these substances.

DUST AND DUSTING.—At all times unwholesome, when dampness gets hold of dust it ferments, decays and becomes positively poisonous; and this must needs happen on any rainy day, on foggy mornings, on dewy nights, and at that season of the year when dampness seems to penetrate the house, and it is not yet time to light the fires that might dry it out or hinder it. The rooms of a dwelling-house, then, cannot be too thoroughly swept and dusted off, in order that the least possible deposit of dust may be left in them. Many housewives think that the less the dust is stirred in sweeping, the better the work is done, and tea leaves and wet grass or moistened meal is thrown about the floor in order to gather the dust and prevent it from rising. But people giving the matter philosophical attention have come to the conclusion that precisely the opposite course is the fit and proper one; that a good stirring up and then a good blowing out is what the dust needs, and that with a wind blowing unobstructedly through the room as thoroughly as a wind can be made to blow.—*Harper's Bazar.*

WANT OF COMPANIONSHIP AND ILL HEALTH.—There is a human hunger which we are all apt to overlook in our inventories of hygienic agencies. Hard-working women on lonely farms and in isolated villages, and frequently women in large cities, too, often find themselves growing irritable and nervous, and even troubled with religious doubts, in spite of their fervent prayers. They do not need tonics or moral discipline. They need contact with new minds, new ideas, new scenes, just as their lungs, after using up all the oxygen in a close room, need the air out of doors. Girls are too apt voluntarily to force themselves into this state; disappointed in their natural longings for a congenial companion, they resolve to live within their own resources, which are not sufficient to keep off famine. "Only a god or a brute can dwell in solitude," says a wise old German. Every human being needs congenial companionship for health's sake as well as for happiness.

SLEEP A PREVENTIVE OF HEADACHE.—A scientific writer says: Sleep, if taken at the right moment, will prevent an attack of nervous headache. If the subjects of such headache will watch the symptoms of its coming, they can notice that it begins with a feeling of weariness or heaviness. This is the time a sleep of an hour, or even two, as nature guides, will effectually prevent the headache. If not taken just then it will be too late, for, after the attack is fairly under way, it is impossible to get sleep till far into the night, perhaps. It is so common in these days for doctors to forbid having their patients waked to take medicine if they are asleep when the hour comes round, that the people have learned the lesson pretty well, and they generally know that sleep is better for the sick than medicine. But it is not so well known that sleep is a wonderful preventive of disease—better than tonic regulators and stimulants.

DIPHTHERIA AND MANURE HEAPS.—M. Ferraud, *Lyon Medical*, traces the relation between manure heaps and rural epidemics of diphtheria. On one occasion the disease appeared the day following a general street cleaning. He argues that manure should be kept in closed wells of stone, glazed with bitumen, so constructed that the fluids may filter away from the solid matter.

DANGER IN NICKEL-PLATED WARE.—An order has been issued in Lower Austria forbidding manufacturers and tradesmen to sell nickel-plated cooking vessels. It is stated that vinegar and other acid substances dissolve nickel; and that this, in portions of one-seventh of a grain, causes vomiting, and is even more poisonous than copper.

DEATHS FROM BEING STRUCK BY FALLING METEORS.—Prof. Shepard, of New Haven, makes a statement which will surprise most persons. He says: "There have been several instances of deaths occasioned by meteoric stones. Two monks in different places were thus killed in Italy, and two sailors on shipboard in Sweden."

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MINING AND AGRICULTURE.—*Cor. Amador Sentinel*, Jan. 5: Our resources are both mineral and agricultural, the former having quadrupled in 10 years and the acreage under cultivation having more than doubled in two years. The ready cash market for all the farmers have to sell enables them to improve their land, which should bring about a hearty co-operation between miners and farmers, though at present the ranchers are inclined to work to the detriment of the miners. They have secured their land from the Government by patent and refuse to allow the miners to prospect. This land along the "mother lode" is better adapted for mining than agriculture, and hence the dissatisfaction between miners and farmers, which in the interest of all parties should be speedily compromised.

MILLS.—*Amador Ledger*, Jan. 8: The 10-stamp mill at Quartz Mountain is kept running steadily. Heretofore, the trouble has been to save the sulphurets, which are very fine, and carry a large proportion of gold. The ore altogether is of low grade, and cannot be profitably worked unless the sulphurets can be saved. The present owners have added Fruc concentrators, which are giving good satisfaction, and it is believed that the huge mountain of quartz which has given to the vicinity the name of Quartz Mountain can be made to pay handsomely. The company talk of increasing the milling capacity to 60 or 80 stamps in the spring, as the ore body in sight is practically inexhaustible. The new 10-stamp mill erected by M. M. Culbert, on Rancheria creek, is idle for want of water. It is thought that the ore which is to supply this mill will yield at least seven dollars per ton in free gold. Three-stamp mill of the Olive mine at Drytown is expected to get in running order in a few days. They are now engaged in constructing a reservoir to store the water from the Pacific mill, and in cutting a ditch from this reservoir to Drytown. By this plan they will get free water. The ore is estimated at four or five dollars per ton. With free water and a large mill such low-grade rock, if easily mined, might be worked at a profit. We presume the present small mill is intended merely for testing purposes.

SUTTER CREEK.—The Mahoney mill and mine came to a standstill last week on account of Mr. Stewart wanting the water for the Lincoln mill. There is not sufficient water for both mills, and Mr. Stewart having the first right, the Mahoney had to hang up stamps. It will take from a month to six weeks for the Lincoln to crush the rock on hand, when the Mahoney will probably resume. Sam Smithers, formerly engaged in mining in this county, but who of late years has been superintending the Dry Gulch mine in Idaho, has arrived here to take charge of the Wildman, which is to be started up at once. John Trelogan, Sr., will be here in a few days, to act as general manager of the property. Tarr's mill has completed the contract for lumber for the 40-stamp addition to the Pacific mill. The last two loads of lumber were to be shipped to Plymouth this week.

Butte.

CONSOLIDATED GOLD CLANNEL MINE.—*Oroville Register*, Jan. 6: This mine was originally patented by Geo. North and Henry Turner, some two years ago, both of whom are experienced river miners. During one of their exploring and prospecting expeditions on the north fork of Feather river, they discovered that at one place—some eight miles above the mouth of the Big Bend tunnel—the river was diverted from its direct course, by a high point of serpentine rock, pursuing a course at right angles to its general direction, for a distance of 800 feet or more, where it was again turned immediately back upon itself, forming a perfect loop of more than 2000 feet in length. The last 1500 feet of this loop has for ages been the receptacle of a large portion of the gold that has been washed down this branch of the Feather river, and has accumulated with a large deposit of gravel and enormous boulders in that portion of the river, to such an extent that the lower part of this loop becomes an immense dam of auriferous gravel. This gravel deposit they endeavored to work by sinking holes therein, but the loose nature of the gravel permitting the inward flow of water so readily, prevented them from attaining to a greater depth than four feet, and at this depth it required constant bailing while prospecting, but in every instance they found very rich gold-bearing gravel. Feeling confident that there was from 25 to 35 feet of this auriferous, undisturbed gravel in the river bed at the loop, they have organized a joint-stock company, for the purpose of draining the loop. The necessary surveys have been made, and disclose the fact that there is a fall of 28 feet in the loop. The accumulated auriferous gravel is in the lower 200 feet. The survey further shows that a tunnel of 445 feet in length will take the water of the river from the head of the loop and deposit it at the foot of the loop, draining the whole river bed for that distance (2000 feet), and as much further down as it should be deemed expedient to carry the water of a flume along the river bank. In conversation with T. W. Reese, C. E., who made the surveys, and who also made the first or preliminary surveys for the Big Bend tunnel, he informs us that, in all his experience of 35 years in California, he has never seen so favorable a spot for the deposit and retaining of gold in a river bed. That in shape it more nearly resembles the old Cape Claim (from which \$1,000,000 was extracted in 57 days) than any place in a river he has ever seen.

Calaveras.

FROM MURPHY'S.—*Calaveras Prospect*, Jan. 8: Since the rains, mining has made rapid strides, and a good showing will be made in the near future as to bullion shipments, increased activity, etc. The Oro Plata mill and pulverizers have been running continuously day and night since they first started up, and the cleanup will prove the thoroughness of the able management. The Burleigh is now placed in position in the level of the Red Wing, another of the company's mines, and will be started in a week. This will give work to a number of unemployed miners. The Esmeralda's new mill will start up in eight or ten days. The mine presents a fine appearance and excellence of ore, and will give a good ac-

count of itself. The recent rains will doubtless start up the Cunliff & Driver mill again, aiding materially to swell the bullion product of this section. In short, the mining news of this whole region is good, and favorable for good results.

RICH SILVER ORE.—*Mountain Echo*, Jan. 5: Rich silver ore is being extracted from the Jones mine near the mouth of Carson creek, some three miles from this town. Mr. Dockstader, the superintendent, presented this office with a small piece of the ore the other day, which competent judges claim will assay \$1000 a ton in silver. Be that as it may, the ore is certainly immensely rich.

Inyo.

SAN CARLOS MINE.—*Independent*, Jan. 8: From time to time S. A. Densmore does a little work on the San Carlos mining claim above Independence station. Recently a shipment of 170 sacks of ore was made to the new works at Reno. The ore weighed 20,873 pounds and its value was 40 ounces silver per ton and 49 per cent lead; net value of the whole, \$429.97. In any other part of the State ore that would net to the owner over \$40 per ton would be mined vigorously. Here in Inyo county, mines like the San Carlos attract but little attention and are worked only by fits and starts. If we could borrow Edison for awhile and get him here to electrify miners, farmers, and all others into a little more animation, the county would go ahead more rapidly.

Nevada.

BOSS.—*North San Juan Times*, Jan. 2: The shaft in the Boss mine is now nearly 70 feet in depth. The rock to the depth of 60 feet was of the same quality and character as that found at the depth of 20 feet, but the rock below 60 feet is of a different grade of ore. It is, as one of the owners expressed it to us, "more quartz." Free gold is found in this as well as the other, and the owners of the mine feel that they have a bonanza. The width of the ledge at the present depth is not known, but as the shaft is over six feet wide it is known certainly that the width of the ledge exceeds six feet.

MINED FOR COPPER AND FOUND GOLD.—*Transcript*, Jan. 8: J. R. Nickerson, a farmer living on the Auburn road 14 miles below Grass Valley, a number of years ago sank a shaft on his land in hopes of finding a paying ledge of copper. Some pretty good ore was struck, but it did not abound in large enough quantities to afford encouragement for working. Lately he sank deeper in the hope of opening a bigger deposit, and the vein widened somewhat as it was descended on. He has discovered since beginning operations the second time that the rock is quite rich in gold, and he is now working the claim for that metal and getting good results.

CRUSHING.—*Foothill Tidings*, Jan. 5: A test crushing of two and one-half loads of rock from the W. Y. O. D. mine, just back of Kate Hayes' Hill, has been completed at Penhall's mill. The yield was nearly \$35 per load. This ledge is strong and well defined, lots of it in sight, is in picking ground, and of course Brockington & Co., the lessees, feel jubilant about it. At the State ledge, or Perrin mine, much deadwork has been done of late, to the end that the incline shaft might be rectified to better conform with the trend of the ledge. This work has been successfully completed and a splendid looking ledge is now revealed at the bottom of the shaft. Francis & Co. are lessees of this mine, and a crushing of rock will doubtless prove that their labor has not been in vain.

AN UNEXPECTED FIND.—*Foothill Tidings*, Jan. 6: On the 16th of December last, Frank Jones and Benny Penhall were working in Wolf creek, above the Crown Point mine, for the purpose of repairing a dam that turns the water for running the machinery at Penhall's quartz mill. A hole was dug in order to put in a supporting post, and in this hole a quartz ledge, 2½ feet thick, was struck, and free gold was seen in the rock. No croppings of this ledge could be seen. The ground around there is "made ground," or the surface is composed of dirt washed down on the flat. The services of Mr. Charles E. E. Uren, county surveyor, were secured, and the ground was surveyed and a location made for a mine. The locators are Frank Jones, Benny Penhall, Edward James and Samuel Henwood. The name given to the location is the Calumet. A drain for the ground is now being run, and when that is completed a shaft will be put down at some distance from the creek. The Calumet is in a respectable neighborhood, being between the Idaho and Crown Point mines. This find illustrates with force the advice we have often given to Grass Valley people, to wit: Never dig a hole in this district for any purpose whatever without looking carefully into that hole; for as apt as not a quartz ledge will be discovered at the bottom.

Placer.

A DRIFT TUNNEL MINE.—*Grass Valley Union*, Jan. 8: The Morning Star drift gravel mine near Iowa Hill is approaching near the point where regular drifting operations will be commenced. The driving of a bedrock tunnel into the claim has been going on for years, the progress being slow on account of the hard character of the rock. Because of this, a year or more ago an upraise was made from the tunnel into the gravel channel overhead, and then a drift run upon the course of the channel over 400 feet. The bedrock was found to pitch, and the drift being carried along on level grade, winzes were sunk at intervals to determine the quality of the gravel on the bedrock. The prospects were uniformly good, and from the last winze sunk very rich gravel was taken out, two small carloads yielding \$13 to the car. A number of pieces of coarse gold were taken out in the course of this plan of prospecting, but generally the gold was like melon seeds, as found in the blue cement, and almost appearing as if placed there by hand. These prospects were so encouraging that the company determined to drive the main tunnel ahead to bottom the channel. The distance to be run was about 500 feet, and for the past year this work has been diligently prosecuted until last Saturday, when the contract was finished, making total length of tunnel 2350 feet. An upraise was started on Monday of this week, and from the survey that has been made it is estimated that the raise will come into gravel in 12 feet near the winze where the gravel prospected so richly when the drift was run overhead, and it will only be a short time when the regular work of drifting and washing the gravel will be commenced, and there is every reason to believe that the claim will prove rich,

and as the company owns a large piece along the channel, it will take a long time to work it out. The Morning Star claim is owned mostly in Grass Valley, J. C. & E. Coleman being the principal owners. Capt. Frank Richards is also interested, and there may be others. Jacob H. Neff, of Colfax, is also an owner, and is superintendent of the mine.

BIG BLUE.—*Placer Republican*, Jan. 12: A company has started to work the Big Blue quartz mine at Secret Town below Gold Run, and the present prospects are very favorable.

AT FOREST HILL.—*Placer Herald*, Jan. 8: The Excelsior mine is having all its machinery removed from the bottom, and will close down when the removal is completed. It is rumored that a tunnel will be run soon.

Plumas.

GOOD QUARTZ.—*National*, Jan. 8: We are informed that Mr. Swan has just made a cleanup at his mine in Granite basin that averaged \$24 per ton. Good enough. We hope it will never pay less.

NUGGETS.—We were shown by Major Whitlock last Monday several ounces of coarse, washed gold taken from Grizzly creek, above Genesee valley. The pieces weighed from one to ten dollars, and there is certainly a very rich channel in the immediate neighborhood of where it was taken out.

San Bernardino.

LEACHING ORES.—*Calico Print*, Jan. 8: The leaching works owned by Edwards, Bahten & Co. are doing a good business. It is the intention of the company, we learn, to soon add to the works a rock crusher and motive power to run the same, and also build more tanks. They have an opportunity to do an immense business, for there are millions of tons of low-grade ore in the camp which cannot be profitably reduced except by the leaching process. The character of the Calico ores consists principally of chlorides, particularly adapted to leaching. The sulphides and other rebellious ores exist in the camp only in comparatively small quantities. The leaching works will be of great benefit to chlorides, who can utilize low-grade ore thrown on the waste dump, and realize from one dollar to five and six dollars per ton for rock that will not pay to haul to the quartz mill, which will considerably reduce the cost of mining, and turn into bullion a vast quantity of ore that has accumulated on the numerous dumps during the past five years. Already a stimulating effect is beginning to be felt throughout the camp, and mines are being worked that heretofore were considered of too low a grade to yield a paying profit. Undoubtedly the largest leaching works on the coast will be established here, and there is enough ore in sight to keep them in operation indefinitely. Old-time miners predict that there are better times ahead for Calico than she has ever seen in the past.

Shasta.

THE NEW REDUCTION WORKS.—*Republican Free Press*, Jan. 8: On Thursday last our local visited the new reduction works now being erected just below the gas works, and found Mr. Chick with some half-dozen men busy at work grading and laying a foundation for the furnace in a building erected for the purpose on the brow of the hill. On the bank of the creek will be the concentrating room, next above the pantroom, next the pulproom, and above all the furnace and rock-breaker, making a perfect fall all the way down, so that there need be no handling of the ore. The machinery is expected to-day, and active operations will be commenced. Mr. Chick had put up a small furnace and was engaged in sampling ore for customers, among them Messrs. Copeland & Co., which came out very promising, and they expect to put up works on their mine. De Forest's arastra, last Thursday, was employed crushing rock for an assay which had been sent all the way from the vicinity of Lake View, Oregon.

Sierra.

RESUMED.—*Sierra Tribune*, Jan. 8: Work has been resumed on the Golden Eagle ledge. The owner will erect in the spring a quartz mill for crushing the rich ore taken from this mine. The ledge is four feet in width, the formation being porphyry. A report comes to town that the Forest King mine at Gold Lake has suddenly widened out to ten feet; all excellent ore. Hope the boys will adjust all their differences and go ahead and make a pile out of this promising mine.

GOLD BLUFF MINE.—The Gold Bluff is situated about one mile above Downville on the North Yuba river, and near the county trail going to Poker Flat. It has been in operation for more than 20 years. A. Van Slyke, the owner, has for the past two years been running a lower tunnel to tap the ledge. Last week it was reported that he had struck the ledge, which turned out to be a stringer. There are six ledges that will be struck in this tunnel. Mr. Van Slyke is also owner of the Butcher Ranch mine, of which Mr. Casserly is superintendent.

HELENA AND ETHEL CONSOLIDATED.—We were shown some fine-looking quartz from this mine which, in appearance, closely resembles the Phoenix rock. This rock is adjacent to the Phoenix and is four feet in width, and lies between porphyry and slate, and carries free gold and iron sulphurets. The owners, Messrs. Mooney, Schlessinger and Littlejohn, will soon commence work in developing the mine. The indications are favorable for a valuable property.

A GOOD LOCATION.—The Marietta quartz lode, which was formerly the Le Compton, has been located by F. J. Stephenson and James Hammill. At a depth of 10 feet a four-foot ledge, showing free gold and iron sulphurets, has been uncovered. The ledge is adjoining and south of the Cleveland and northwest of the Calinas and Mercer. The location is favorable for a good and permanent ledge.

Trinity.

COARSE GOLD.—*Journal*, Jan. 8: Jake Hershberger was in from New River this week and showed us three or four ounces of coarse gold, among which were several five or six dollar pieces. He informs us that Rufe McDowell & Co. recently picked up a couple of 50-dollar nuggets in their Pony creek claim.

RICH ROCK.—Developments continue in the seam or lode recently discovered by Messrs. Tourtellotte, Smith & Bowers near Minersville. Following the seam, pockets are frequently met with containing bunches of quartz filled with gold. Unlike the pockets usually found, the quartz is not decayed, but firm, hard and live, and on being broken by the

hammer has to be torn apart, as the gold holds it together. The largest bunch found weighed 50 pounds and yielded \$1400, while the richest bunch was 12 pounds which produced in the mortar \$655. Verily this is richness.

BULLYCHOOP.—Under date of December 27th, a friend writes from Cleveland, Trinity county, that Mr. Hart, superintendent of the Cumberland Mining Company, returned from San Francisco on the 22d. While there he purchased new machinery for a 10-stamp mill, and a new boiler—the largest in Trinity county. Active preparations are going forward and all will be ready to put the machinery in place when it arrives. The company is running the old mill on very good rock, crushing from 12 to 14 tons every 24 hours.

Tuolumne.

WATER SCANT.—*Tuolumne Independent*, Jan. 8: The prospects for a late summer supply of water this year do not look encouraging. It is the early snowfall which packs down in the mountains that our ditches draw on as a base for a late water supply. The early snows freeze and pack and melt gradually in summer, while that which falls late melts rapidly and floods the country, and cannot be beld back. Thus far very little snow has fallen in the mountains, and the winter is half gone. Unless the mountain storms come very soon, the snow pack will be light and water for mining purposes will give out early next summer.

NEVADA.

Washoe District.

HALE AND NORCROSS.—*Enterprise*, Jan. 8: The south drift on the 1300 level has been advanced 40 feet. East crosscut, 100 feet south of the shaft, has been advanced 15 feet. The last five feet of this drift is in good ore. On the 1200 level the north drift has been advanced 28 feet, and the south drift 26 feet. On the second station level the west drift has been extended and timbered 30 feet. The south drift on the 1300 level has now reached the Chollar north boundary, and an east and west crosscut started on the line. The south drift is being continued in Chollar ground.

CROWN POINT AND BELCHER.—Since the closing down of the Combination shaft the water has gradually raised, until it has risen to a depth of 18 inches in the 1700 station. This necessarily stops the extraction of ore there from the Crown Point and Belcher. A supply of ore is being extracted from the 1500, 1600 and 1400 levels; also from the 200, 300 and 400 levels. Considerable prospecting is being done in the upper and lower levels. About 270 tons of ore are being extracted daily from the two mines.

HAYWOOD.—The winze is now down 106 feet and continues to improve. Assays from the bottom of the winze average \$106, and from the face of the tunnel \$55.50. Indications are very favorable for the development of a fine body of rich ore. On account of not being able to get the rock crushed, the force has been somewhat reduced. Arrangements are being made to get more mill facilities, when the full force of men will be put on again.

SAVAGE.—No. 6 west crosscut on the 600 level shows about 12 feet of fair ore. The south drift on the 500 level is also in ore. No change worth reporting in the 800 level crosscuts. The Sutor tunnel level shows good milling ore. The new gallows frame at the old shaft is almost completed, and expects soon to hoist ore through that shaft. Ore is being taken out through the Sutor tunnel.

POTOSI.—The south winze is down 40 feet and looks the same as last week. South drift in Potosi is now in 54 feet, and the face looks as well as ever. Upraise from the southeast drift is up 50 feet, and is still in good ore. Operations are confined to the 250 level.

IOWA.—A and B tunnels have made good progress during the week. A, the upper tunnel, has cut several quartz feeders in the last 10 feet, giving assays from \$40 to \$85 in gold. The stratification of rock in this tunnel denotes near approach to front ledge.

YELLOW JACKET.—Everything is going on as usual. Extracting 170 tons of ore daily that is coming from the 1300 and 1400 levels. This ore is being crushed at the Brunswick mill. It is worked very successfully by the Golden Gate concentrators.

SCORPION.—The work of repairing the machinery and getting ready to start the shaft was resumed on January 1. Have gotten up steam, and are repairing the shaft. In a few days will be able to start opening the new level.

ALPHA AND EXCHEQUER.—Hoisting works about completed, and have started the engine. The guide is in, and the work of prospecting has been commenced.

IMPERIAL.—The work of repairing the shaft continues. The shaft serves as an excellent means for ventilating the Yellow Jacket mine.

BULLION.—The Ceresus shaft has been sunk to a depth of 200 feet. Stations are being opened on the east and west sides.

CHOLLAR.—The old Chollar shaft is cleaned out and repaired a distance of 360 feet.

BALTIMORE.—Still repairing shaft and making good progress.

Columbus District.

MOUNT DIABLO'S NEW MILL.—*Tuscarora Times-Review*, Jan. 8: The Mount Diablo Mill and Mining Co. having decided to build a mill at Sodaville, on the line of the railroad, some 20 miles from its mine, is pushing the work with vigor. The mill is to be of 10 stamps, with a plain cylinder roasting furnace, six pans and three settlers. The company expects to have the mill ready to crush ore before the 1st of April next. Through the use of its new mill the Mt. Diablo will save \$5 per ton on its ore and its output will be entirely free from interruptions. With the 1200 or 1500 tons of loose ore now in the mine and what there is in sight, this mill will be kept running a long time.

Eureka District.

ORE SHIPMENTS.—*Sentinel*, Jan. 8: During the past week ore shipments were made from the mines of the district to the two reduction works in town, as follows: To the Richmond works—Dunderberg mine, 48 tons; Eureka Star, 1 ton; Hoosac, 5 tons; Geddes & Bertrand, 19 tons; Williams, 18 tons; Silver Lick, 12 tons; Alexandria, 6 tons; Williamsburg,

12 tons, Eureka Consolidated works—Gen. Lee mine, 3 3/4 tons; Alexandria, 2 7/8 tons; Morey, 8 tons.

Gillis Mountain District.

A BIG LEDGE.—Walker Lake *Bulletin*, Jan. 12: Jim Merrigold is working hard on his big ledge in Gillis and has a marked improvement to show as the result of his labor. This is about the largest ledge in the county, and will some time be the source of wealth for a great many people.

Granite District.

STRIKE.—White Pine *News*, Jan. 8: Parties in from Cherry Creek inform us that a rich and important strike was made in the Pittsburg mine about ten days ago by Judge Doolin and Thomas Kenney. While doing annual assessment work they struck a body of ore that goes 100 ounces in silver and \$25 in gold. The size of the deposit had not yet been ascertained, but it bids fair to prove a large one. Granite District is showing up well for the limited amount of work done on it.

Hawthorne District.

THE LAPANTA.—Walker Lake *Bulletin*, Jan. 12: Rapid and good work is being done in the Lapanta, and the condition of the mine is hourly improving. Continued increase of the quantity of good ore in sight makes the property more valuable every day, and while none of us can claim any credit for the gold being there, nevertheless Esmeralda county people are proud of the gold mine.

THE VIRGINIA NO. ONE.—A new claim called Virginia No. One, situated about two miles north of the Burnhille, promises well. Messrs. W. G. Wilkison and C. E. Kennedy, the owners, have a man at work on it now, and have several tons of good ore on the dump. There is every probability that they will have a good mine, and Wilkison's and Kennedy's many friends are well pleased at their good luck.

ORE SHIPMENTS.—A large lot of Lapanta gold ore and a smaller lot of Hindley silver ore were shipped to Reno last Sunday. These shipments are but the forerunners of many, and, as each will put money into circulation, the general condition of business will steadily improve.

Mount Cory District.

THE MOUNT CORY.—Walker Lake *Bulletin*, Jan. 12: The visit of Geo. R. Wells, president of the company, was made pleasant both by the complete arrangements for the comfort of himself and guests and by the splendid condition of the mine which they came to inspect. The amount of the work which had been done was an agreeable surprise, although they had expected to see extensive improvements, but the extent and value of the ore body was the most agreeable of surprises. The mine is now looking better than ever, and, without doubt, in a few months, concentrators will be erected near Coryville and a permanent bullion camp established. There are but 21 men at work, at present, but they are doing remarkably good work and no mine on the coast was ever so rapidly and judiciously developed, by the same force and at the same cost. Fourteen feet of drift was made in ore on the 120-foot level, last week, and on the 200-foot level the drift was advanced 25 feet.

Reese River District.

PROBABLE SALE OF THE MANHATTAN.—*Silver State*, Jan. 8: It is reported that the Manhattan mines at Austin have been sold to an Eastern company of capitalists, who have been negotiating for some time past for their purchase. The fact that M. B. Farrell, book-keeper of the Manhattan Co., and L. J. Hanchett, who has been negotiating the sale, left for San Francisco together yesterday, gives color to the rumor.

Tuscarora District.

BELLE ISLE.—*Times-Review*, Jan. 7: Belle Isle and Navajo joint crosscut west, 150-foot level, has been advanced 14 feet during the week. East crosscut, same level, has been advanced four feet; rock continues very hard.

TORNADO CON.—Extended tunnel to feet during the week; ground very tight and no improvement to note. Ledge in south cut very large—we have not reached hanging wall as yet—showing some sulphurets throughout the ledge.

NAVAJO.—During the week, the south drift on east vein, 350-foot level, has been extended 6 1/2 feet. North drift on new vein, 150-foot level, has been extended 12 feet.

NORTH BELLE ISLE.—North drift on east vein from No. 1 crosscut, 150-foot level, has been extended four feet. North gangway, 300-foot level, has been advanced 15 feet. The rock has been as hard as flint all the week. North gangway, 400-foot level, has been extended 42 feet.

NEVADA QUEEN.—Work for the week has been as follows: West crosscut No. 1 from north gangway 200-foot level has been extended 35 feet; total length, 125 feet from turntable, 95 feet to No. 1 shaft. Water has not increased any. No. 1 shaft has been sunk 10 feet. Water has more than doubled during the week; total depth 193 feet. North gangway 350-foot level was started and extended 15 feet; rock very hard.

White Pine District.

BULLION SHIPMENTS.—White Pine *News*, Jan. 8: The Eberhardt-Monitor Mining Co. shipped this week, through Wells, Fargo & Co.'s Express, three bars of bullion, valued at \$2500. The Argus Co. shipped this week, through Wells, Fargo & Co.'s Express, two bars of bullion, valued at \$3100.

ALASKA.

SILVER BAY DISTRICT.—*Alaskan*, Dec. 27: The owners of claims in the Silver Bay district have given the best possible evidence of the faith that is in them by faithfully complying with the law in the way of doing the necessary amount of assessment work. So far we have not heard of a single claimant who is delinquent in that regard. Capt. P. T. Tracy keeps pegging away on the "lower ledge" at the head of Silver bay, where he has a comfortable log house erected, and where he is confident of being able to develop for his syndicate a regular bonanza. This is the ledge in which Messrs. Stone and Swift are interested, and of which one or the other will probably have the management when active mining operations are commenced. Wonder if they

wouldn't like to have a mine in which the "pay shoot" is all pure gold, already coined and ready for circulation? An Eastern party countermanded an order for the examination of a gold-bearing ledge in the Silver bay district with a view to the investment of a few thousand dollars for a controlling interest, because some of the rock sent them assayed no more than \$43.50 to the ton, though some of it had gone into the thousands. It would almost seem as if a ledge 10 to 15 feet wide, between well-defined walls, the rock from which will assay \$43 to the ton, ought to be almost promising enough to gamble a few thousand dollars on.

COAL.—Lieut. Stoney reports finding a five-foot vein of coal of good quality in the Muskovian region, while another party, with whom the *Alaskan* is acquainted and in whom it has confidence, stands ready to show any one who will guaranty him an interest in the mines when developed, a similar vein on Cook's inlet, the coal from which he says he has tried and found every bit as good as, if not better than, that of Vancouver island. The time is not far distant when the coal measures of Alaska will receive such practical attention as will forever settle the question of their adaptability to steam and manufacturing purposes, or else conclusively demonstrate their worthlessness. The *Alaskan* has no fear of the result once the question is fairly and practically settled.

ARIZONA.

PROMISING OUTLOOK.—*Tombstone Democrat*, Jan. 10: The outlook of the camp for its future was never more promising than at present. A limited number of men are being employed in the different mines, and from preparations being made it is apparent that a speedy resumption of work and a revival of former good times is about to be inaugurated. The Emerald mine is working a force of 50 men, taking out ore and shipping it to the Charleston smelter, which is still being successfully operated, and the company are continuing the shipment of bullion. Supt. Cheyney, of the Toughnut, has a force of men at work cleaning up the mill, repairing machinery, laying track, etc., preparatory to starting up the mine and mill. The Knoxville and Wage mines, properties of the Boston Mining and Reduction Co., are being satisfactorily worked by T. M. and M. Co. The ores are shipped to Charleston for fluxing purposes. James Carr, who owns more teams and knows more about freighting than any man in the Territory, will return to Charleston by the 15th, and it is reported for the purpose of entering into a freighting contract with the Copper Queen Co., vice the steam wagon—a financial failure. B. S. Coffman, superintendent of the Rattlesnake Mining Co., is working a force of about 25 men on the Bunker Hill, drifting to connect with the main shaft of the Mammoth, owned by the same company. They have encountered a good body of ore in the drift, and are taking out and shipping to Charleston considerable high-grade ore, carrying chlorides and manganese flux, which until recently has been shipped to Socorro. This company owns three properties, the Mammoth, Bunker Hill and Rattlesnake, all of which are good producers, and they have been working right along without regard to the low price of silver. As soon as the Mammoth shaft is reached the company will put on all the men that can be worked to advantage.

MINING NOTES.—*Prescott Courier*, Jan. 10: Mr. W. C. Dawes has engaged teams to haul wood to the Peck mill, and hopes soon to have the mine dry and to keep the mill running night and day. He says he is certain to make a fortune out of the mine, and we believe he will. Col. H. A. Bigelow, of Hassayampa district, gives good reports of mining in his section. A letter from Tiptop says that the mill is running; company shipping plenty of silver. Pack trains, with rich ore, arrive in Prescott almost every day from the mines. Banks and assay offices handled \$20,000 in gold and \$37,000 in silver last week.

COLORADO.

PROSPECTS.—*Boulder News and Banner*, Jan. 5: The day of prospect holes has passed. The day for developed property is at hand. Baron Von Wendt tells us that he intends working mining property in Boulder county soon. The mining outlook for Boulder county has never been so flattering. The year 1886 was one long to be remembered. But just now we bear it from every camp that 1887 will beat the record of all past years. Benson & Mooney hailed from Ward last Wednesday. They deposited with the smelter some 13 tons of ore from the New Boston mine which sold for \$48 per ton. Time occupied in mining said to have been 15 days. Denver parties are taking hold of Boulder county mines in different parts of the county. Let every miner in the county owning property see that it is put in working order at once. Foreign capital is finding its way into Colorado, to be invested in mining property, and already parties are quietly looking over the fields of this country.

RED MOUNTAIN.—*Cor. La Plata Miner*, Jan. 6: Work is being pushed actively in all directions, and all the mines have lately increased their force, and we expect great activity in mining circles between now and spring. The Brooklyn, which is situated about 1500 feet above the old town of Red Mountain, was some time ago bonded to a syndicate of Philadelphia capitalists, who are represented by Mr. Jos. Wilkinson, of Durango, who awarded a contract for 125 feet of crosscutting on the 10th of last October to Jack Skeely, John McMullen, Darby Hastings and T. Wilcox. The crosscut on the Reality has reached the vein, and shows 20 feet of mineralized vein matter. This is another fine-looking Cockscrew gulch property. A claim of some note is the Chicago, which is being worked by the owners. It has a shaft 50 feet, six by eight feet in the clear, and well timbered. At the bottom is a well-defined streak of low-grade ore, which shows signs of improvement as depth is gained. Tom Guinan will soon take charge of the Dutton mine. He put a small force to work on the Genesee this morning, which he will increase to 15 or 20 men as soon as he gets his new boiler in place. The Carbonate Queen, near the Carbonate King, is looking bigger as development progresses. A streak from 12 to 15 inches wide of good pay ore is showing in the breast of the 30-foot drift which is run from the bottom of a 20-foot shaft.

IDAHO.

THE GOLD HILL MILL.—*Statesman*, Jan. 6: Mr. W. C. Wilcox came down from Quartzburg, Boise county, Tuesday night, on his way to San Francisco. Mr. Wilcox has been at Quartzburg nearly four months superintending the erection of the new Gold Hill mill, and on Friday last he had completed the work and started the engine and set the machinery to running. The engine and boilers and in fact every part of the mill was overhauled, and more than half of the machinery was new—new boilers, new engine bed and principally all the engine was new. Shafting, that was the least warped by the fire at the time the old mill was burned, when it was used again had to be straightened. The mill now runs like clockwork, better than the old engine and old mill ever run. It is a 25-stamp mill, the same as it was before. Mr. Coughanour will start the mill to crushing quartz the 1st of February, and will be prepared to keep it running constantly as in days of old. This mill gives new life to Quartzburg, for the mine has been and probably is to-day, when running, one of the best gold-producing mines in Idaho. It has been operated for 20 years, with no signs of letting up.

LEAD MINES OF WARDNER.—*Coeur d'Alene Record*, Jan. 6: Herbert Lang, speaking of the output of the great lead mines of Wardner for 1886, says: "The gross lead production of the Wardner mines, the only ones which have shipped any ore worth mentioning, will probably amount to 3000 tons of lead, their shipments being at the rate of 28 tons per day, for six months, of a material that will produce, allowing for loss in smelting, 60 per cent of lead. This amount, at 4 1/2 cents, the now ruling price for lead, would be, deducting first the customary loss of 10 per cent in refining, \$256,500. Consequently it follows that for this year the two great mines of Wardner are actually furnishing 30 per cent of the gross lead product of all Idaho."

SMOKY MINES.—*Wood River News-Miner*, Jan. 9: George Montgomery returned from the King of the West mine Saturday forenoon. From him and from other sources we learn that the King of the West shows one of the finest and most extensive bodies of ore on Wood river. They are sinking a two-compartment incline shaft which shows fine ore all the way down, while they are also upraising to the surface with a view to erecting hoisting works early in the spring. This development in the King of the West shows that the mines of Smoky go to the deep, and are destined to rank among the leading producers of Idaho, and is a warning that the mines in this vicinity must look to their laurels or Smoky will take the lead.

THE PACIFIC.—*Coeur d'Alene Record*, Jan. 6: On this considerable prospecting was done at discovery, sufficient to show position and course of vein. This being ascertained, a tunnel was commenced 115 feet west, which, at the time of the reporter's visit, had been run about 45 feet, including the open cut, the greater part of that distance being on the ledge which was struck at bedrock. The trend of the ledge is northwesterly and southeasterly, dipping to the northeast with inclination to the south. The quartz so far is much decomposed, but becomes more solid as depth is attained. It carries sulphurets, but in much smaller quantities than the Arctic. Considerable free gold is visible and the owners think it is likely to prove a free milling ledge. There are probably 50 tons of ore on the dump, 100 feet above the Arctic dump and about 400 feet above the creek. The character of the country rock is the same as that already described. The average of the assays is \$12.50. Marked improvement is noticeable as depth increases.

THE INDIAN lies directly above the Pacific. The discovery stake is 400 feet above the Pacific discovery, and consequently about 800 feet above the bed of the creek. The ledge has a northwesterly and southeasterly course, with northern dip and southern incline. But little work has yet been done on account of the deep snow. Four feet of ore has been uncovered in clearing away space for a shaft. Lowest assay \$9.50.

THE ATLANTIC.—East of and adjoining the Indian, and lying above the Arctic, is the Atlantic, the ledge of which has the same course, dip and incline as the Indian, and the one is probably a continuation of the other. A face of six or seven feet of ore, assaying \$22, is visible where the tunnel will be run. The indications on both the upper claims are very fine, and the owners seem inclined to think that their value will prove even greater than that of the Arctic and Pacific.

NEW MEXICO.

NOTES.—*Rio Grande Republican*, Jan. 6: The Providencia mine, in Chloride flat, is again in rich ore. Two carloads of concentrates are shipped weekly from Pyramid. The Homestead mine, Gold Hill, is showing better at every foot. From Camp Apache mining district the reports are still favorable. At Socorro the daily receipts of ore run from 20 to 60 cars per day. In Germania mine, at Cooney, a 4-foot vein of peacock ore has been struck. Thirteen tons of ore from the Lochiel mine, Kingston, netted \$545, or \$49.61 per ton. Two hundred and fifty dollar ore has been struck in the Shingle canyon mine, Georgetown. The owners of the Jane Bowman mine, Socorro, are much encouraged over a new strike. The Tenderfoot mine, Malone, shipped a carload of high-grade ore to Socorro the past week. Kingston sampling works are overrun with ores. Each miner has to wait his turn to get ore treated. Crown Point mine, Gold Hill, has a fine lot of ore at the dump to be treated by the Standard mill when completed. The Graphic mine, Cook's Peak district, shipped last week a carload of 100 ounces ore to the Socorro smelter. The Young Man mine, Malone, has yielded over \$100,000 to date. Murat Masterson, of Deming, is one of the owners. One hundred and twenty-seven carloads of ore and material was one day's receipts at the Socorro smelters last week. From the Peterson mine, four miles north of El Paso, come reports of ore richly sprinkled with chlorides of silver. The Standard mine, Gold Hill, claims \$200,000 worth of ore on its dumps and blocked out in the slopes of the mine. The Lucky mine, Cerrillos, has reached a depth of 157 feet and has fissure ore that assays \$110 in silver and 33 per cent of lead. The Last Chance mine, Victoria district, has been leased by Gustave Billing, of Socorro, who will put a large

force at work soon. The Kimbell district—Stein's Peak—country is still booming, the ore is abundant, but water is rated at \$1 per barrel. The Chao mine, Chance City, which has been idle for some time, has been leased by Gustave Billings, and work will be commenced on it soon.

MONTANA.

TATRADYMITO ORE.—*Butte Inter-Mountain*, Jan. 11: A letter from Max Meyer, of Brandon, corrects information given us by a former correspondent, concerning Bush & Myers' mine. He says that only one assay has been made so far on the tellurium ore. That was made by the Boston and Colorado smelting works, at Argo, Colorado, and was as follows: Tatradymito ore, sample No. 4, ounces of gold, 223.66; 600 ton ton; ounces of silver, 187 per ton. Fifteen hundred pounds of this ore was worked by arasta process, and from it was cleaned up 12 ounces of gold. The lead matter has a width of from one to three feet. The ore body is from four inches to 6 foot wide, and the streak of tellurium is all the way from one to four inches thick. The Bullion, a mine near Brandon, and worked by A. Cislser, is producing its regular shipments of ore (one carload per month), which is shipped to the Omaha reduction works for treatment. The ore is galena and runs from 60 to 75 per cent in lead, \$150 to \$200 in silver, and from \$6 to \$8 per ton in gold. The Big Chief, owned by Mr. Gilbert, of Virginia City, is producing some high-grade ore.

THE BIG MINES.—*Inter-Mountain*, Jan. 6: A Helena special to the *Inter-Mountain* says that the Drumlunnon produced upward of \$200,000 last month with 120 stamps in operation. It is a great output, and at present is beaten in Montana only by the Anaconda at Butte. Next month, however, the Granite Mountain will make a bid for second place. It promises to see the Drumlunnon and go it \$40,000 better. If the Bluebird had 60 more stamps it would lead all the silver mines of the West in the amount of its production.

OREGON.

SCANT WATER.—*Jacksonville Times*, Jan. 7: There is not enough water yet to give all the placer miners a fair show. G. C. Culy is opening some promising mining claims at the mouth of Brush creek. The miners of Steamboat and Brush creek districts have an abundance of water and will make a good run. Ennis & Cameron are putting a new flume in the old English diggings at Galice creek, which they now own. Austin Sargent struck excellent prospects in his diggings in Brush creek district. He has since sold out to Russell & Co. Considerable ground which was left over from last season is now being cleaned up, and more or less gold dust is already finding its way to this place. Quite a force of men were engaged in prospecting the Gold Hill Mining Co.'s claims last week and found some nice specimens of ore. They have finished their work and returned home.

UTAH.

REVIEW.—*Salt Lake Tribune*, Jan. 7: The receipts in this city for the week ending the 5th inst., inclusive, were \$25,781.45, of which \$125,001.34 was bullion and \$90,780.11 was ore. The previous week the receipts were \$112,353.07 in bullion and \$23,177.76 in ore; a total of \$135,530.83. The Ontario output for the week was 23,097.43 ounces of fine bullion and \$29,477.06 from sales of ore; a total of \$52,574.49. The year opens with an undimmed prospect for this great property. The daily product of the week was nine bars of bullion, 13,698.93 fine ounces, and \$5931.23 in ore, an aggregate of \$19,130.16. This company now has a good surplus, and will no doubt at an early day join the ranks of the dividend-payers. Base bullion receipts for the week were \$6,886.47; fine bars, \$43,094.11; gold bars, \$8584; silver bars, \$14,624.69; selected lead, \$5926.08. The product of the Hannauer smelter for the week was \$20,455 in bullion. The stormont sent up on the 31st silver bars to the value of \$330. The Bannock sent down from Elia on the 3d, bullion to value of \$1920. Ore receipts in this city for the week were \$42,604 by Wells, Fargo & Co.; \$40,730 by McCormick & Co., including \$11,480 from the Queen of the Hills; and \$7446.11 by T. R. Jones & Co.

SUNNY BOY'S GROUP.—There is a group of mining claims of much promise over on Bonanza flat, toward Snake creek, that is worthy of special notice, mention of which was omitted in the *Record's* New Year's edition for want of space. This group is owned by bond by F. McLaughlin, H. Hirschman and F. J. McLaughlin, who have spent considerable money in development work on the claims. The Columbia, Silver Bell, Kentucky and Tessie are the claims of the group which were located only a few years ago. On the Columbia is a shaft down 125 feet alongside the vein, which assays well in silver, lead and some gold. The Columbia incline, down 125 feet to the top of the ledge, shows splendid indications. The Silver Bell, which is an extension of the Columbia, is developed by a 200-foot tunnel and a shaft now down about 100 feet, all in ledge matter. On this property there is a drift of 60 feet on the line of the vein, and a crosscut has been run a distance of about 100 feet to tap the vein at a lower depth. The workings in these two mines are connected, but active development is at present delayed on account of the amount of water which flows from the upper workings too fast for comfort. The assays from the Silver Bell run higher than the Columbia, some average samples going as high as 27 ounces gold with a fair percentage of lead. This group was recently bonded from B. Hamilton, and a transaction of a startling nature will likely be heard as being in process of negotiation, very soon, on this fine property. Our informant assures us that big results can be looked for from the Rochester group next summer. In the discovery shaft the vein contains about 10 inches of ore that runs from \$700 to \$1000 per ton. This strike is a late one and bids fair to put out hell. The Hamilton, owned by Brig Hamilton, H. Hirschman, Geo. Tait, Wm. Wright and others, is a good property. This claim is worked by a tunnel which has been persistently driven 214 feet in solid granite. It has been run to tap the ledge at a great depth, and the work of 12 or 15 feet more is expected to expose the hidden treasure of the vein. The owners have every confidence in this ground, and there is little doubt but that they have a good thing.



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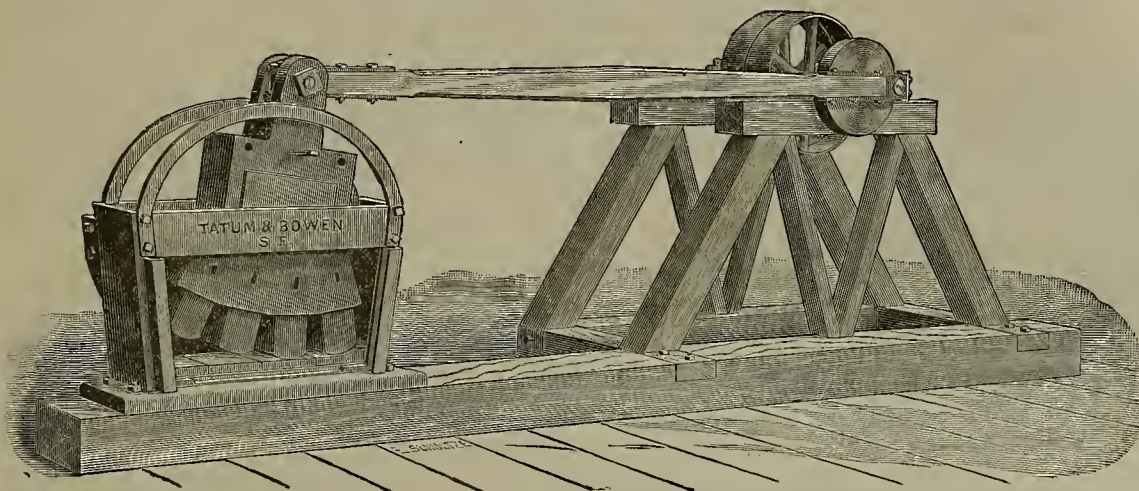
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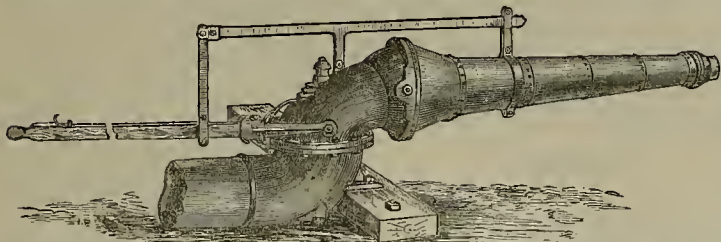
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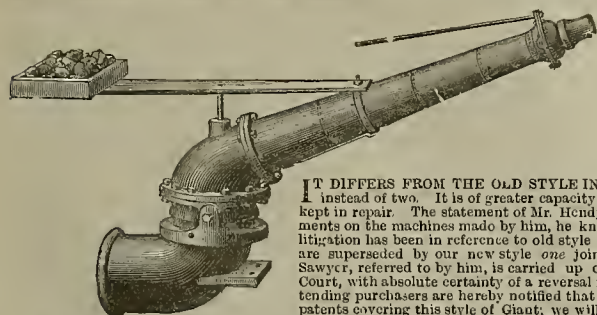
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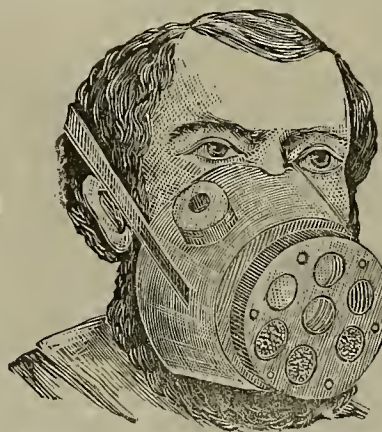
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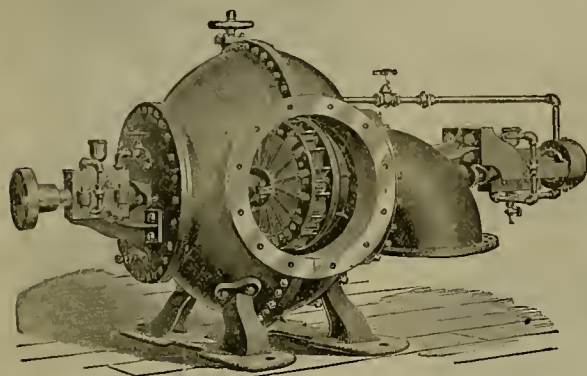
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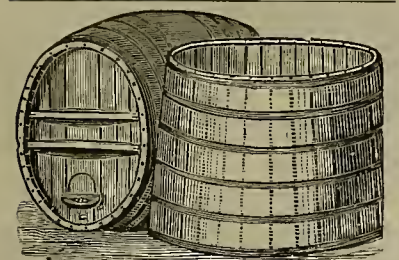
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G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

O. H. AARON,**ASSAYER AND METALLURGIST,**

NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

WM. D. JOHNSTON,**ASSAYER AND ANALYTICAL CHEMIST.**

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Personal attention insures Correct Returns.

SPENCERIAN STEEL PENS Are The Best

Established 1840.

USED BY THE BEST PENMEN

Noted for Superiority of Metal, Uniformity, and Durability.

20 Samples for trial, post-paid, 10 Cents.

IVISON, BLAKEMAN, TAYLOR, & CO.,

753 and 755 Broadway, New York.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

VENTILATING CARS.—Joseph A. Buckley and Chas. J. Koefed, S. F. No. 355,586. Dated Jan. 4, 1887. This is a device for supplying cars with pure, cool air. Fan-blowers are mounted in pairs on the wheel-trucks of the cars, and there is a water-tank in the cars into which the air from the blowers is discharged, and an independent ice chamber above, through which second chamber the air is conveyed. The dust and foreign matter in the air is caught in the water. The air pipes are so arranged as to arrest any moisture.

VENTILATING CARS.—Joseph A. Buckley and Chas. J. Koefed, S. F. No. 355,587. Dated Jan. 4, 1887. This is a device for ventilating cars by constantly removing from the car the fuel and heated air which accumulates therein. This is accomplished by suction-fans, so mounted that one will act while the car is moving in one direction, and the other when the car is moving in the opposite direction. Suitable pipes and valves are arranged to perfect the invention.

GOPHER GUN.—Frank L. Emerson, Brentwood, Contra Costa Co., Cal. No. 355,602. Dated Jan. 4, 1887. This is one of the class of guns especially adapted for killing burrowing animals, such as gophers, ground squirrels, etc. These animals are found in great abundance in the western part of the United States and elsewhere. The invention consists in the combination of parts which form a complete gun, easy of operation and effective for the purpose. It may be easily inserted in the required position, and after being set may be loaded with safety and discharged with accuracy.

Mining Share Market.

Mining stocks have been rather active this week. The volume of transactions is such as to keep all the brokers very busy, and, by the way, there are many more brokers in business than there were a month or so since. Chollar, Potosi, Norcross, and Savage have been leading. The strength of these stocks, the *Enterprise* thinks, is due to very interesting developments of ore being made on the 1300 level of the Hale and Norcross, and the fact that an east and west crosscut has been started on the Chollar line; also that No. 6 west crosscut on the 600 level of the Savage shows about 12 feet of good ore, and the south drift on the 500 and the Suro tunnel levels are also in ore. In Potosi the upraise from the southeast drift, on the 250 level, is up 50 feet, and is still in good ore. The Belcher, Crown Point, and Yellow Jacket mines continue to make large daily shipments of ore to mills on the Carson river.

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, Jan. 13, 1887.	
ANTIMONY—French Star.....	49 @
BORAX—San Bernardino.....	@ 8
ARMAGAS.....	@ 5
IRON—Hengarnock ton.....	@ 23 00
Ballston ton.....	@ 22 00
American Bolt, No. 1, 500.....	24 @ 50
Oregon Pig, ton.....	21 @ 23 00
Clippor Gap, Nos. 1 & 4.....	22 @ 23 50
Olay Lane White.....	21 @ 50
Shot, No. 1.....	23 @ 50
COPPER.....	
Bolt.....	25 @
Sheeting.....	18 @ 23
Ingot.....	12 @ 13
LEAD—Fig.....	4 75 @
Bar.....	5 25 @ 5 50
Sheet.....	8 @
Shot, discount 10% on 500 bag Drop, 3/4 bag.....	1 65 @
Buck, 3/4 bag.....	1 85 @
Ohlled, do.....	2 05 @
ZINC—German.....	8 @ 9
Sheet, 7/32 ft, 7 to 10 lb, less the cask.....	6 @
QUICKSILVER—By the flask.....	33 @ 39 00
Flasks, old.....	1 05 @
Flasks, new.....	85 @
TINPLATE—Coke.....	4 90 @ 4 95
Charcoal.....	6 25 @ 6 50
STEEL—English, lb.....	14 @ 15
Black Diamond, ordinary sizes.....	10 @
Flow.....	4 @ 5
Machinery.....	5 @ 6
Sanderson Bros.....	10 @

Bulk Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Eberhardt-Monitor, Jan. 8, \$2900; Argus, 8, \$3100; Belbird, 4, \$17,840; Alice, 8, \$26,272; Hanauer, 4, \$8135; Bannock, 4, \$1620; Alice, 4, \$10,200; Silver Reef (for December), \$26,205; Queen of the Hills, 5, \$3000; Stormont, 6, \$3735; Hanauer, 6, \$2000; Queen of the Hills, 7, \$3900; Hanauer, 7, \$3900; 8, \$3850; Bannock, 9, \$4800; Hanauer, 9, \$5815. Last week Wells, Fargo, & Co. shipped from Salt Lake, in bullion, \$111,168; McCormick & Co., \$66,475; T. R. Jones & Co., \$27,996; Union Bank, \$10,200.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not know any send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

SONOMA COUNTY COAL.—Work at the King & Hills coal mine, on Mark West creek, five miles north of Santa Rosa, is being prosecuted diligently. A shaft has been sunk over 125 feet. This is intended to tap the main ledge. One ledge, eight inches in width, has been passed, the quality of coal taken from it being far superior to that found near the surface.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Con M Co.....	Nevada.....	21.....	50.....	Jan 12.....	Feb 17.....	Mar 10.....	L Osborn.....339 Montgomery St
Caledonia S M Co.....	Nevada.....	41.....	15.....	Nov 23.....	Dec 23.....	Jan 19.....	A S Groth.....414 California St
Champion M Co.....	California.....	22.....	10.....	Nov 23.....	Jan 7.....	Jan 25.....	T Wetzel.....352 Montgomery St
Columbus Con M Co.....	Nevada.....	5.....	50.....	Dec 22.....	Jan 27.....	Feb 18.....	J M Huntington.....309 California St
Dictator Con M Co.....	Nevada.....	1.....	01.....	Dec 15.....	Jan 22.....	Feb 12.....	J F Boller.....Hawthorne Nev
Gorla M & M Co.....	California.....	4.....	06.....	Nov 26.....	Dec 31.....	Jan 21.....	A A Enquist.....436 Montgomery St
Golden Pledge G M Co.....	California.....	7.....	10.....	Nov 22.....	Dec 27.....	Jan 15.....	W J Gleason.....Phelan Block
Goldens G M Co.....	California.....	2.....	03.....	Dec 22.....	Jan 27.....	Feb 16.....	J M Huntington.....309 California St
Kluclad Flat M Co.....	California.....	2.....	00.....	Jan 5.....	Feb 14.....	Mar 7.....	W H Keith.....432 California St
Live Oak D G M Co.....	California.....	4.....	10.....	Dec 7.....	Jan 15.....	Feb 5.....	T Wetzel.....522 Montgomery St
Mides G & S M Co.....	Nevada.....	3.....	25.....	Nov 23.....	Dec 22.....	Jan 17.....	T W Nowlin.....520 Montgomery St
Mayflower Gravel M Co.....	California.....	35.....	25.....	Nov 23.....	Jan 22.....	Feb 17.....	T Morizo.....323 Montgomery St
Mexican C & S M Co.....	Nevada.....	33.....	25.....	Jan 4.....	Feb 8.....	Mar 2.....	G B Elhot.....309 Montgomery St
North Sierra Nevada M Co.....	Nevada.....	4.....	20.....	Nov 26.....	Jan 21.....	Jan 24.....	J L Fields.....330 Pine St
Navajo M Co.....	Nevada.....	16.....	25.....	Jan 7.....	Feb 10.....	Mar 3.....	J W P w.....310 Pine St
Orleans Con M Co.....	Nevada.....	1.....	05.....	Dec 8.....	Jan 12.....	Feb 2.....	J Stoddard Jr.....419 California St
Phoenix Con M Co.....	California.....	1.....	06.....	Dec 8.....	Jan 10.....	Jan 31.....	C Collisson.....516 California St
Peerless M Co.....	Arizona.....	9.....	10.....	Nov 16.....	Dec 23.....	Jan 17.....	A Waterman.....359 Montgomery St
Polar Star M Co.....	New Mexico.....	1.....	07.....	Nov 17.....	Dec 31.....	Jan 15.....	J O Stump.....339 Montgomery St
Pneumatic M Co.....	California.....	5.....	20.....	Jan 4.....	Feb 14.....	Mar 8.....	H Pichoir.....320 Sansome St
Sierra Iron Co.....	California.....	2.....	50.....	Nov 18.....	Dec 22.....	Jan 18.....	H P Bush.....431 California St
Sierra Nevada S M Co.....	Nevada.....	37.....	25.....	Jan 4.....	Feb 9.....	Mar 1.....	E L Parker.....309 Montgomery St
Utah S M Co.....	Nevada.....	54.....	50.....	Nov 20.....	Dec 24.....	Jan 19.....	A H Fish.....309 Montgomery St
Yosemite Queen M Co.....	California.....	2.....	02.....	Dec 4.....	Jan 11.....	Feb 1.....	H O De Landress.....628 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Crocker M Co.....	Arizona.....	A Waterman.....	328 Montgomery St.....	Annual.....	Jan 17
Cosmopolitan M Co.....	Nevada.....	B Burris.....	309 Montgomery St.....	Special.....	Jan 21
Head Center Con M Co.....	Arizona.....	W Pew.....	310 Pine St.....	Annual.....	Jan 27
Monterey M Co.....	California.....	J W Sessions.....	320 Sansome St.....	Annual.....	Nov 30
Sulphur Bank Q S M Co.....	California.....	T Wintling.....	306 California St.....	Annual.....	Jan 17

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Con California & Va M Co.....	Nevada.....	A V Havens.....	309 Montgomery St.....	50.....	Jan 10
Martin White M Co.....	Nevada.....	J S Seville.....	309 Montgomery St.....	25.....	Dec 20
Paradise Valley M Co.....	Nevada.....	V Letta Oliver.....	323 Montgomery St.....	10.....	Dec 30
Silver King M Co.....	Arizona.....	J Nash.....	328 Montgomery St.....	25.....	Dec 15

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 23.	WEEK ENDING Dec. 30.	WEEK ENDING Jan. 6.	WEEK ENDING Jan. 13.
Alpha.....	2.00	3.75	2.25	3.00
Alta.....	2.00	3.65	3.00	4.00
Andes.....	1.00	2.50	1.00	1.35
Argenta.....	.15	.25	.15	.25
Belcher.....	3.00	4.10	3.10	3.75
Brophy.....	1.20	1.25	.50	1.00
Best & Belcher.....	7.50	13.67	8.10	9.00
Bullion.....	1.70	3.00	1.90	2.65
Baltimore.....	.85	1.10	.85	1.25
Belle Isle.....	.30	.40	.35	.40
Bodie Con.....	3.10	2.50	2.90	2.65
Benton.....	1.00	1.15	.90	1.10
Bodie Tunnel.....	1.00	1.05	1.00	1.00
Butler.....	1.35	1.50	1.20	1.30
Con. Va. & Cal.....	.22	.33	.16	.22
Challenge.....	1.50	2.60	1.00	2.00
Champion.....	.30	.50	.40	.60
Chollar.....	5.00	11.75	6.00	8.00
Confidence.....	5.00	11.75	6.00	8.00
Con. Imperial.....	1.00	1.70	.50	2.00
Caledonia.....	.60	1.00	.50	.65
Con. Pacific.....	.35	.50	.30	.40
Crown Point.....	4.00	6.00	3.50	4.75
Crocker.....	.65	1.00	.90	1.00
Central.....	.50	.55	.50	.55
Dudley.....	.25	.25	.25	.25
East B. & B.....	.25	.25	.25	.25
Eureka Con.....	1.00	1.40	1.00	1.40
Exchange.....	1.25	2.50	1.25	2.50
Grand Prize.....	.50	.50	.50	.50
Gould & Curry.....	3.60	5.25	3.50	4.00
Hale & Norcross.....	3.00	3.00	3.00	3.00
Holmes.....	3.00	3.00	3.00	3.00
Independence.....	.25	.25	.25	.25
Iowa.....	1.00	2.25	1.25	1.75
Julia.....	.75	1.25	1.00	1.50
Justice.....	1.50	2.00	1.50	2.00
Kentuck.....	1.50	2.00	1.50	2.00
Lady Wash.....	.50	1.10	.55	1.00
Martin White.....	2.50	2.65	2.50	2.65
Monro.....	2.50	2.65	2.50	2.65
Mexico.....	4.00	5.00	4.00	5.00
Mt. Diablo.....	3.50	3.75	3.50	3.75
Northern Belle.....	.75	1.00	.80	.90
Navajo.....	4.25	3.30	3.30	3.25
North Belle Isle.....	.75	1.00	.80	.90
Niagara.....	.90	1.40	.75	1.00
New Queen.....	.90	1.40	.75	1.00
North G. & O.....	3.25	4.10	2.75	3.00
Occidental.....	1.30	2.10	1.50	1.75
Opbir.....	6.25	9.00	6.50	8.50
Overman.....	.50	.80	.55	.65
Potosi.....	.45	.75	.45	.60
Peerless.....	.30	.45	.25	.35
P. Sheridan.....	.40	.45	.40	.45
San Jose.....	8.00	12.00	8.50	12.50
Savage.....	.50	.80	.55	.65
Seg. Belcher.....	3.50	8.00	4.40	4.70
Sierra Nevada.....	.35	.75	.50	.70
Silver Hill.....	.75	1.00	.80	.90
Silver King.....	.30	1.45	.75	.90
Scorpion.....	.20	.30	.25	.30
Syndicate.....	2.45	5.75	3.40	3.75
Union Con.....	4.00	7.00	4.80	6.00
Utah.....	4.00	7.00	4.80	6.00
Yellow Jacket.....	1.00	1.50	1.00	1.50

Sales at San Francisco Stock Exchange.

THURSDAY Jan. 13, 1887.	100 Iowa	1.55	
720 Alta.....	2.95 @ 3.05	788 Julia.....	1.00 @ 1.20
350 Andes.....	1.50 @ 1.55	230 Lady Wash.....	.65 @ .70
150 Alpha.....	3.50 @ 3.60	450 Alpha.....	.60 @ .65
300 Argenta.....	.20 @	320 Mexican.....	.60 @ .65
470 B. & Belcher.....	10 @ 10.10	100 Mono.....	3.05 @
1425 Bullion.....	3.05 @ 3.15	850 N. Belle Is.....	3.45 @ 3.50
250 Bodie Con.....	3.05 @	510 New Queen.....	1.20 @ 1.25
300 Benton Con.....	8 @ 9.00	100 Navajo.....	.65 @
50 Belcher.....	.40 @	420 N. Bonanza.....	.25 @
200 Baltimore.....	1.10 @ 1.15	200 Niagara.....	.50 @
150 Brophy.....	1.05 @	924 Opbir.....	11 @ 11.10
470 Bullion.....	3.50 @	250 Overman.....	1.50 @ 1.55
100 Central.....	.50 @	100 Occidental.....	.70 @
760 Chollar.....	10 @ 10.10	400 Peerless.....	.80 @ .85
205 Con Va & Cal.....	.21 @	500 Potosi.....	8 @ 8.10
110 Crown Point.....	5 @ 5.10	250 P. Sheridan.....	.40 @
430 Crocker.....	1.20 @	350 Quinn.....	1.00 @
80 Confidence.....	2.25 @	300 Savage.....	.60 @ .65
150 Challenge.....	2.25 @	200 Scorpion.....	1.40 @
310 Exchange.....	2.10 @ 2.25	450 Silver Hill.....	.60 @ .65
100 Eureka Con.....	4.75 @	570 Sierra Nevada.....	.60 @ .65
320 Flower.....	8 @ 8.10	350 Union Con.....	7 @ 7.10
570 Gould & Curry.....	5 @ 5.10	60 Utah.....	.50 @ .55
1265 Hale & Nor.....	8 @ 8.10	210 Yellow Jacket.....	.70 @ .75

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

BULLION valued at \$25,000 was stolen from the St. Augustine mine, Sonora, Mexico, a few days since.

Golconda Mining Company.—Location of

principal place of business, San Francisco, California. Location of works, Calico Mining District, San Bernardino County, California. NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 22d day of December, 1886, an Assessment, No. 2, of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, room 4, 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 27th day of January, 1887, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Wednesday, the 16th day of February, 1887, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. J. M. BUFFINGTON, Secy.

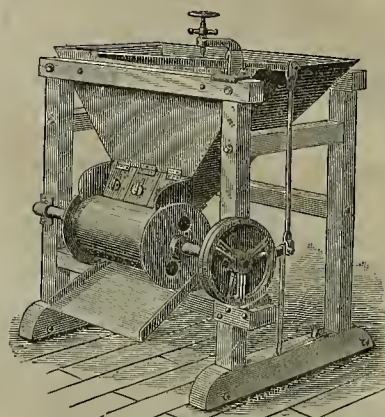
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Flouring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired. Front St., bet. N & O Sts., Sacramento, Cal.

THE ORIGINAL Roller Ore Feeder



This form of Ore Feeder is well adapted for its peculiar work.

In reference to a similar form of "Roller" Feeder, which is being manufactured and offered for sale in this city, and of which a card appears in this journal, we have to say that the Superintendent of the Bunker Hill Gold Mining Company states that the "Challenge" is far superior to the "Roller," he having had both of them operating side by side. We shall be pleased to show this letter, upon application, to any one interested.

We are also manufacturers of the "Challenge" and "Stanford Improved."

Prices furnished by the

JOSHUA HENDY MACHINE WORKS, 39 to 51 Fremont St., San Francisco.

ORE FEEDERS.

We direct attention to an advertisement, which appears in our journal, of the "Original Roller" Ore Feeder, manufactured by the "Joshua Hendy Machine Works," of Nos. 39 to 51 Fremont St., this city.

As the manufacturers of a similar form of Feeder, known as the "Templeton Roller," claim that it is superior to any other style, and cite these in operation at the "Bunker Hill" mill in Adair county, we expressly contradict the statement, and in substantiation submit a copy of a letter shown to us by a representative of the "Joshua Hendy Machine Works," which speaks for itself.

BUNKER HILL GOLD MINING CO., ADAMOR CITY, CAL., July 12, 1886. To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: We have used the "Challenge" and "Roller" or "Templeton" Ore Feeders in our mill for the past three years, and I am free to say that I consider the "Challenge" far superior to the "Roller" Feeder, in that most important of all things in a quartz mill, namely, the regular feeding of ore to the batteries. If the "Roller" Feeder is regulated to feed finely pulverized ore, the coarser ore will choke the outlet of the Feeder, and no ore can reach the batteries. If, on the other hand, it is regulated to feed coarse ore, then the fine ore when it comes will sluice right through and fill the batteries. The "Roller" Feeder requires constant attention. Yours truly, (Signed) N. W. CROCKER, Supt.

SAN FRANCISCO, Jan. 3, 1887. To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: Having used four (4) of the "Roller" or "Templeton" Ore Feeders, built by the Golden State and Miners' Iron Works, of this city, for more than a year last past, in the Bello Gopher Mill, in El Dorado county, this State, and being acquainted with the superior principles of construction and the operations of the "Challenge" Feeder built by yourselves, I unhesitatingly indorse the statements made by Mr. N. W. Crocker, Superintendent of the "Bunker Hill" Gold Mining Company, under date of July 12, 1886, as to the irregularity of the feed of the "Roller" or "Templeton" Feeders under the conditions of use which he names, and I am very truly yours, (Signed) W. G. ROBERTS, Of Greenwood, El Dorado Co., Cal.

JOHN A. ROEBLING'S SONS CO.
WIRE ROPE
 GALVANIZED SHIP RIGGING, MINING, TILLER,
 ELEVATOR, TINNED, & COPPER ROPE, SASH CORDS.
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IRON & STEEL WIRE OF EVERY KIND.
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No. 40 California Street, San Francisco,

—MANUFACTURERS OF—

NITRO-GLYCERINE BLASTING POWDERS.

Vigorit "LOW" Powder,

FOR REMOVING STUMPS AND TREES,
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WORKS: California City, Marin Co., Cal.

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Civil and Mining Engineer,
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The Only Treatise in the English Language.

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Aluminium: Its History, Occurrence, Properties, Metallurgy and Applications, including its Alloys. By Joseph W. Richards, A. C., Chemist and Practical Metallurgist, Member of the Deutscher Chemische Gesellschaft. Illustrated by 16 engravings. 12mo. 346 pages. Price \$2.50, free of postage to any address in the world.

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A circular showing the full table of contents of this volume will be sent free of postage to any one in any part of the world who will furnish us with his address.

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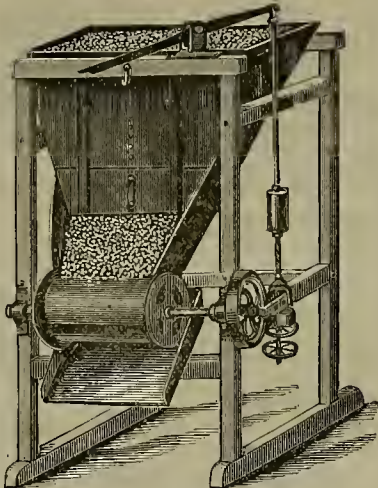
C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY
 Room 709.

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THE ROLLER ORE FEEDER

[Patented May 28, 1882.]



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

Golden State and Miners' Iron Works.

Sole Manufacturers.

237 First Street, San Francisco, Cal.

HENDERSON'S PATENT TRUSS.

Comfortable and Reliable.



This simple truss can be worn without inconvenience, and gives all the comfort to the wearer that can be obtained from a perfect-fitting, pliable apparatus. The pad is soft and yielding, and on account of its peculiar construction and the connections of its securing bands, cannot get out of place. It will remain in place no matter what position the wearer may assume. The engraving shows the construction of the appliance. It is simplicity itself, and is comfortable and reliable. Address,

JESSE G. HENDERSON,
 Grizzly Flat, El Dorado Co., Cal.

Applegarth's Ore-Roasting Oven.

Our new ore-oven is the best in the world for separating the base from the precious metals. The furnace is intended to be worked right at the mine itself, where the ore is produced. It uses very little fuel indeed, and is perfectly economical and practical. Royalty for sale

JOHN APPLGARTH,
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H. P. GREGORY & CO.

Cor. Fremont and Mission Sts.,

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FRANK & CO.'S WOODWORKING MACHINERY.

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BEMENT & SON'S MACHINISTS' TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND EXHAUSTS.

SHIMER MATCHER HEADS.

BRAINARD MILLING MACHINES.

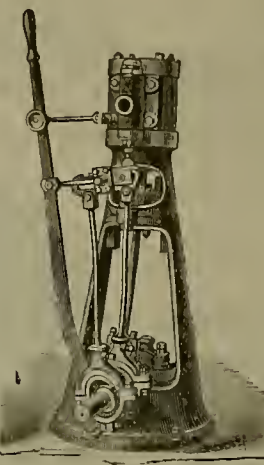
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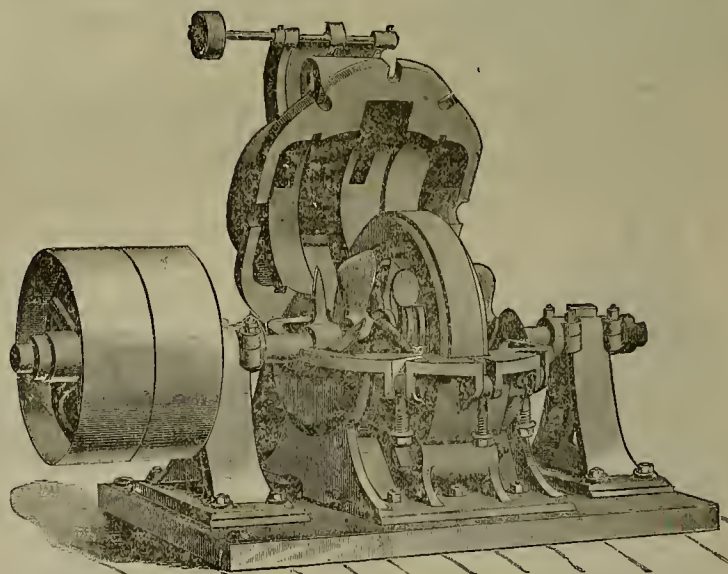
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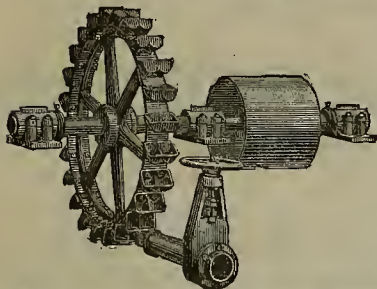
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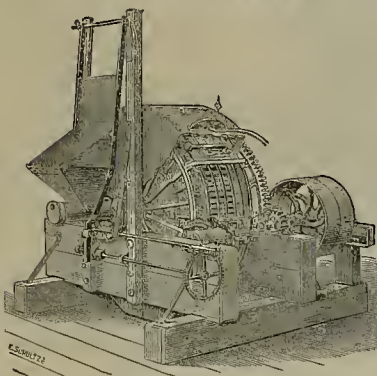
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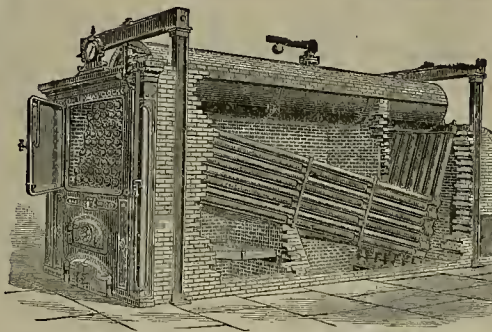
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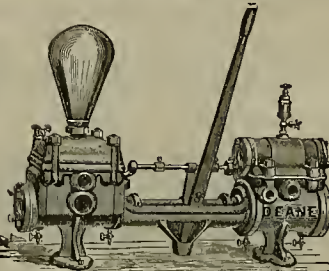
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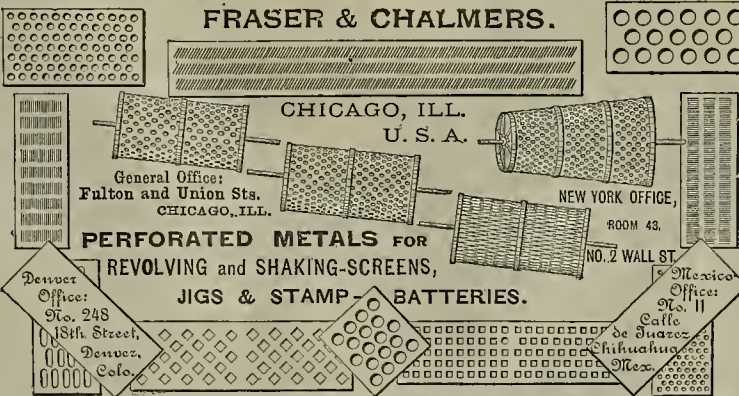
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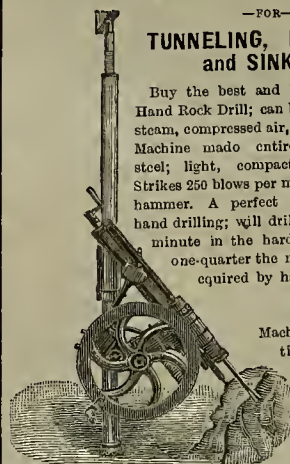
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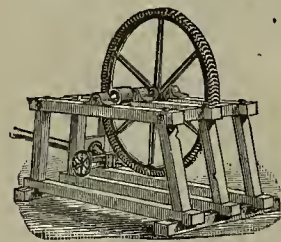


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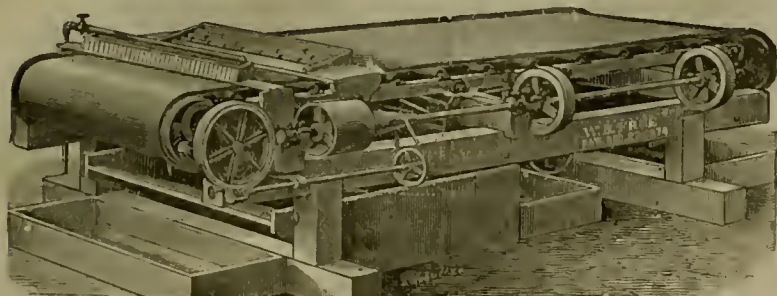
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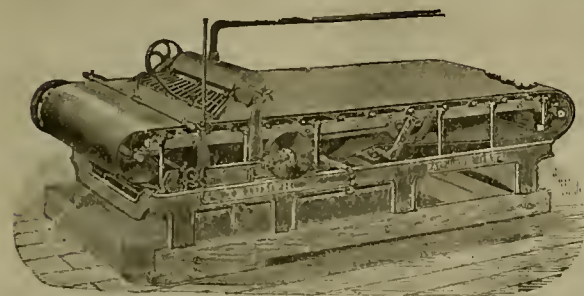
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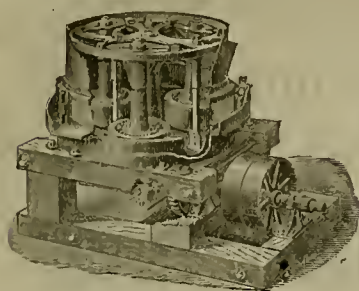
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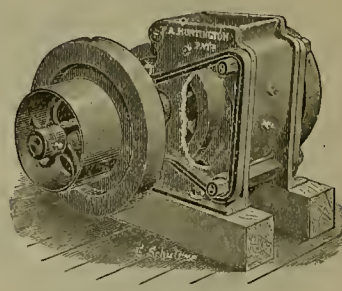
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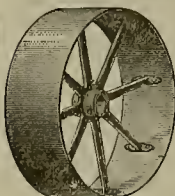
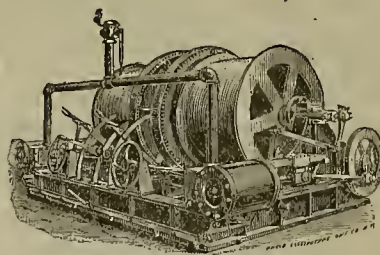
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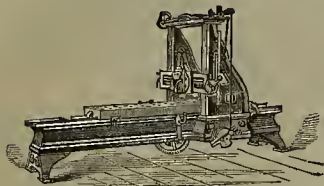
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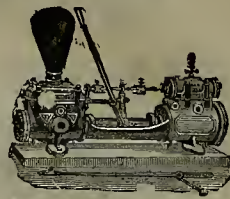


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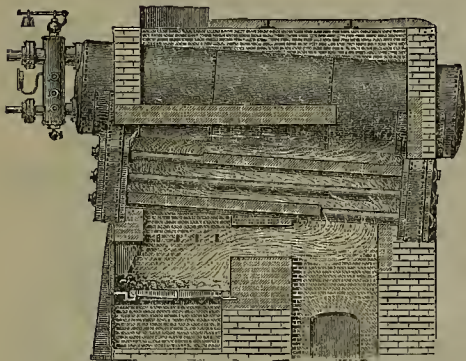
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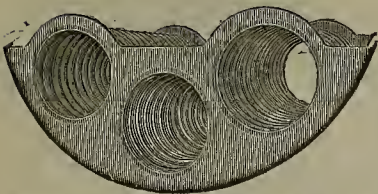
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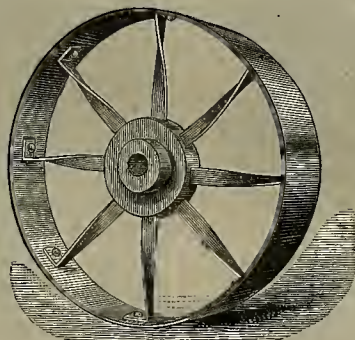
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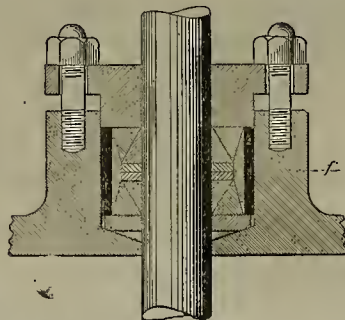
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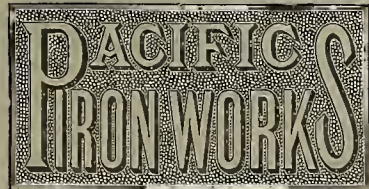
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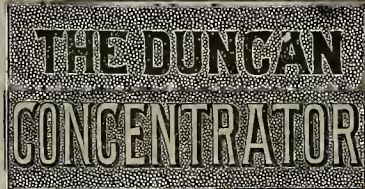
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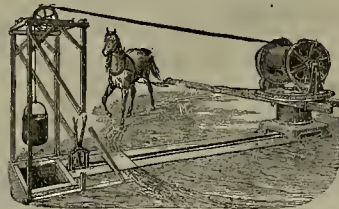
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Best question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE of OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH of the YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700-pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE OF CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JANUARY 22, 1887.

VOLUME LIV
Number 4.

Small Companies in Mining.

It is noticeable that small companies have in the prosecution of mining been more successful than large ones. So generally has this been the case as to become a well-recognized rule. Nor is this rule confined to mining alone. It is one of wide application.

An organization or partnership made up of a few men, provided there are enough of them and they have efficient means for the proper conduct of their business, whatever it may be, is apt to do better than companies consisting of large numbers; nor is it strange that this should be so. A few men in associating themselves together for business purposes are largely governed in their choice of each other by considerations of individual fitness, character, and temperament, various other peculiarities being also taken into account. A partnership or company so constituted in its integral parts is apt to be in accord in all that relates to its common interests. The members are apt to work in harmony; the institution is also efficient, each member performing the duty or service for which his experience, training and natural aptitudes especially fit him.

In the history of California mining the above doctrine finds exemplification in numerous instances. In the case of the Idaho Company at Grass Valley it is well illustrated, the two Coleman Brothers and three or four other persons being here the almost exclusive owners of the property, the Colemans its sole managers. Taking its record as a whole, this may be considered the most prosperous mine in California. In the Providence mine at the same place we have a similar instance of small ownership coupled with large net earnings and superior management.

Turning to individuals, what a conspicuous success have Hearst, Haggin and Tevis, acting as a triumvirate, proved in the mining world working together. The one in the field and the others in council, they seem to have made no mistakes, or if they have made any they have been astute enough to conceal them. Agsin, what a mining team we have in Hayward and Hobart, who, having marched from conquest to conquest, command now the confidence of every one. Four men were mainly instrumental in digging out the big bonanza on the Comstock. The results achieved by Hamilton Smith, Egbert Judson and L. L. Robinson in the province of hydraulic mining are wholly unparalleled in the history of an industry noted for its gigantic operations. Here again we had an organization small in numbers but perfect in all its parts, Smith being competent to the performance of the boldest engineering feats, Judson conspicuous for practical wisdom and Robinson for energy and almost every other sterling business qualification. Without multiplying these examples, suffice to say these lessons tending to teach the superiority of small, compact, carefully organized companies over large and unwieldy ones are numerous in California, nor are they wanting in other mining countries.

HENRY HAWKINS, one of the owners of the Morning Star mine, near Auburn, Placer county, was killed by a cave in one of the lower drifts last Saturday.

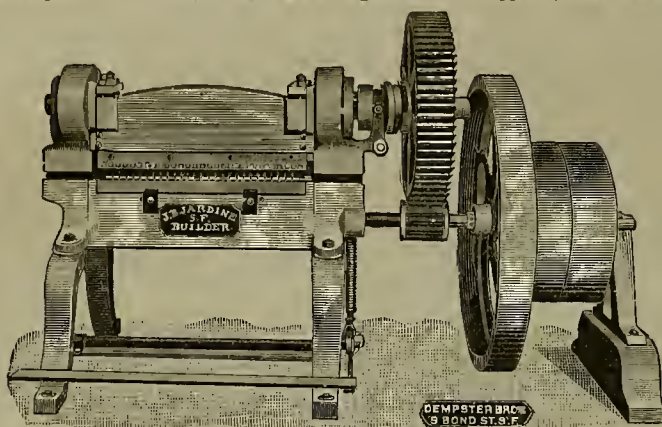
THE Carson mint has been open a few months as an assay office, but does little as a mint, receiving a very small quantity of silver bullion.

Jardine's Multiple Punch.

Some of our sages have said that man is a tool-using animal. Take out of our midst the men who make the tools that uphold the civilization of this age, and the whole human race would be set back into barbarism. Among the tools that show an advance in one branch of art is that which we show on this page. It plays an important part in the development of the fast-growing artesian

builder and inventor is J. B. Jardine. The engraving shows the smallest power machine he makes. Oregon is ahead of California in the size of these machines, as one has been shipped to Portland that will punch 100 holes, or shear a sheet of iron 50 inches wide at one stroke.

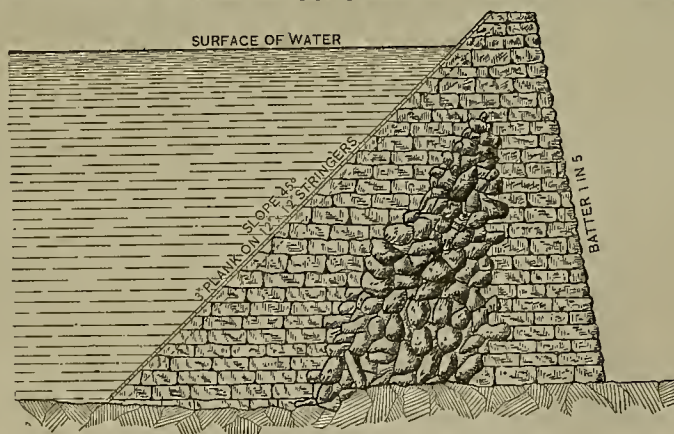
These machines can be used either for shearing or punching. They will do for pipe work, malt-kiln floors, mash-tub strainers, or any kind of work requiring perforation or corrugation of iron, copper, or other metals. The



JARDINE'S 30-GANG OR PIANO PUNCH.

well system of the country. It was not until tools had been invented to make the sheet-iron casings and linings for our artesian wells that such wells became the perfect things they now are. The sheet-iron pipe for bringing water to mines and cities has also aided the advance of civilization. Take out all the sheet-iron pipe

machines are made by J. B. Jardine, 213 and 215 Mission street, San Francisco. The list of iron-working machinery built by this firm is quite extensive. They make over 100 different styles of punching and shearing machines, not to speak of lathes, planers, bolt-cutters, drill-presses, etc. They would only be too glad to



DRY STONE DAM USED IN CALIFORNIA.

that has been made and is to-day doing duty throughout the sparsely settled State of California, and immense damage would be done. Most of this pipe has been made by this or similar machines.

This machine does the work of preparing the iron by steam power. A boy can do as much with it as six men could in the old-fashioned way, so we can build pipe in San Francisco cheaper than can be done in interior towns where rents are cheaper, but where hand work is done. It is really a gang or multiple punch. It punches from 1 to 60 holes in No. 10 sheet iron at one stroke and can easily make 20 strokes a minute.

The holes are made clean and quickly. The

get out the tools necessary to build a Government cruiser. During the year 1886 they built three small steamers—two for Goodall, Perkins & Co. and one for the Mexican Government.

LONDON still leads San Francisco in shipments of silver to China, Japan and the Straits, her exports having been \$26,519,328 in 1886. Those of San Francisco being \$16,558,612 and Marseilles \$956,650. The total export to the countries named being \$44,034,590 against \$56,109,949 in 1885.

THE assets of the Bank of California are nearly \$13,000,000, and those of the Nevada Bank over \$14,000,000.

Dams in California.

Among the most important dams built in California are: The Bowman dam, high 100 feet; length 425 feet; three dams owned by the Milton Mining and Water Company, forming the English reservoir, the largest of these having a high of 131 feet; the Fordyce, of the South Yuba Canal Co., 567 feet long and 75 feet high; catchment basin, 40 square miles; the Enreka Lake dam of the Eureka Lake and Yuba Canal Co., length 250 feet and high 68 feet. All these dams are built of dry rubble stone and faced with a water-tight lining of planks. An engraving of this kind of dam we take from Mr. Bowie's work on Hydraulic Mining in California, together with these facts:

The Tuolumne County Water Company built several timber crib dams, the largest across the south fork of the Stanislaus river. This dam, which is 300 feet long and 60 feet high, rests for its entire base on solid granite bedrock. The cribs, constructed of round tamarack logs, from two to three feet in diameter, and about eight feet square from log to log (10 feet center to center), and the timbers are pinned together with wooden treenails. The cribs have no rock filling.

The face is formed of flattened three-inch timber pinned with wooden treenails to the crib and calked with cedar bark. The flood-water passes over the crest of the dam for the entire length. The water is drawn off by several gates, one above the other, placed on the inclined water-face. The dam was built in 1856. Its total cost did not exceed \$40,000. Pine dams owned by this company, constructed on the same plan, have decayed, while cedar cribs are still in perfect order. The Spring Valley and Cherokee Co.'s Concow reservoir, in Butte county, is formed by two earthen dams, each about 55 feet in height; one of these, which is used as a waste, has its lower side built of heavy brush, imbedded in the earth.

The Leaching Process.

Although the process of leaching (or lixiviation) ores has long been known, it is only within the past few years that it has attracted so much general attention. Certain classes of ores from which the precious metal cannot be fully recovered by amalgamation, can be successfully treated by this process. The system has been fully described by Aaron and Kustel in their respective books on the subject, and the important improvements by Russell, described by Stetefeldt, have added to the interest and value of the process.

Metallurgists all over the country are eagerly reading all that pertains to the process of leaching, and we have endeavored to publish as much as possible concerning it. The articles now being printed in the PRESS, and written by Mr. C. A. Schenck, are of great utility, as they are the observations of a skilled metallurgist, made during practical work on a large scale. This week we give a diagram showing how the leaching works are arranged, with a very full description of certain portions of the process. There is still one article to come, and that relates mainly to the cleanup. We employed Mr. Schenck to write this series of articles, knowing that he had made a special study of the subject, and because his opportunities for practical observation were exceptional.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Scripture Misquotations.

EDITORS PRESS:—In your editorial of January 1st, you reply to my note which appeared the previous week. At the close of your article, you say it is your place to correct errors in Holy Writ which relate to mining. If that is the case, you ought to be accurate in your quotations of Scripture. You quote as from Job 8-1, the following passage: "Surely, there is a vein for the silver and a place for the gold where they fine it." Well, you are just 20 chapters below the one containing that verse, and the word *the*, I put in italics, does not occur in the sacred version. The author of the Book of Job is not so specific as to say that all existing gold is in places or placers; he only intimates that gold does exist in such places. The *gravamen* of my charge against you was that in your editorial of December 4th you were booming silver mining at the expense of gold lode mining, as well as truth. Your recent article proves the justice of my charge.

In it you say: "We believe with some biblical commentators that our rendering of the text is the correct one." Your rendering as given on December 4th was this: "Gold is where you find it." We will see what becomes of this utterance under a justifiable analysis. It means "Gold exists where it is, and you find it there." It would be very remarkable indeed if gold did not exist where it was, and equally remarkable if it could be found where it did not exist. The writing of Moses in the Pentateuch, as well as the Book of Job, is always clear and logical. To make such twaddle as the above drivell from his pen, is unfair to a learned and distinguished writer. I supposed that Paul was the creator of the finely sounding but senseless words, not St. Paul, but Safe Deposit Building Paul, whose inspiration, until he blossomed out as a Bible translator, never carried him higher than a quartz mill revolving battery, but now you announce it as your rendering of scripture truth. And who, pray, are the Bible commentators who agree with you as to these words being the proper rendering for the last half of the first verse of Job 28? You cannot name them, simply because they do not exist.

But I am not done yet in presenting proof as to the justice of my charge against you. In your last editorial you go on to say, "The sacred writer is here describing where and under what conditions the precious metals occur; silver in veins, and gold, as 'Prospector' himself remarks, in placers, or in such places as you may happen to find it." In these words you plainly ignore the presence of gold in quartz veins, and you try even to make me a supporter of your opinion, that gold is a most uncertain metal to search for, and is just as likely to be found by a "tenderfoot" prospector, or pistol-ferous "cowboy," as by a person skilled in the "indications" of blind lodes who can find them under a careful system of reasoning as to the spots from which "float" ore may have come. In my note which appeared on December 25th, I protested against making an improper use of Bible language to convey the impression to your readers that gold might be found by blind chance-digging. You did not heed my protest on that point, and you seem to imply now that I had protested against an opinion you held so tenaciously that you would not relinquish it.

I believe the verse in dispute may justify a wider interpretation than that I gave it in my previous letter. If you were writing for the PRESS an account of the Comstock lode, with a consciousness that your words would be read 5000 years hence, it would be made as short and plain as possible. Getting your pattern from Moses, you would probably say "Certainly, there is a silver vein at Virginia City, and a place for gold where they make it fine." That would be intelligible enough to your readers of this year, for they know the Comstock gold is parted in a suitable place. In Job 28-2 are these words: "Iron is taken out of the earth, and brass is molten out of the stone." It is evident that the author is here describing how the products of nature are utilized by the skill and industry of man. Now, may he not, in the previous verse, he following the same line of reasoning? He may be referring to a silver vein carrying gold, and wishing to say that the metallurgist of that day was able to save the higher metal in a fine state, he adds, there is "a place for gold where they fine it." If the word *refine* had been used, there could have been no mistake, but every one knows that words appropriate in one age become obsolete in another, and yet "fine" is intelligible enough, and has nothing about its connection to warrant the substitution of "find."

If, in 5000 years, some mining journalist, a self-appointed conservator of all the mining utterances of the press of our day, should, with the aid of an Almarin B. Paul, then upon the earth, insist upon making you say in your description of the Comstock—"Certainly there is a silver vein at Virginia City, and gold is where you find it." I trust you will have the power to come back to this world and smite them both in the fifth ribs. If not, then I hope some prospector of that age will "go for them" as I am going for you.

I have only one point more to allude to. You say, "'Prospector' appears to have great

confidence in the biblical lore of our local clergy." I expressed no such confidence. I merely quoted Dr. Sprecher as having alleged that San Francisco was the wickdest city in the United States. Your dragging Jonah and the whale into the controversial arena displays a strong sign of conscious weakness on your part. If you have any dim, distant hope of making us the Jonah on this occasion, I hereby give warning that whale though one of you may be, I shall kick so hard at his true inwardness that he will inevitably be glad to throw me out on dry land and "he at sea" again beyond my reach.

A PROSPECTOR.
Dos Cabezas, Arizona, Jan. 7, 1887.

Theory of Earthquakes.

EDITORS PRESS:—In the December number of a magazine called the *Forum*, published in New York, there appears an article entitled "The Cause of Earthquakes," from the pen of Major J. W. Powell. I propose to criticise briefly some vulnerable points of that article. He bases his theory of earthquake cause on the "molten mass" theory of the earth's constitution. We will therefore analyze this feature of his argument first. In compliance with the deductions of astronomers, geologists have added to their original 30-mile limit until they had established 800 miles for the orthodox thickness of the earth's crust; but Major Powell discards all of this, and now brings the limit back to only 20 miles of thickness. He states the only argument ever advanced in support of the molten theory, namely, the increase of temperature as a descent is made from the surface. Geologists seem never to have considered that this argument if pushed to its logical sequence entirely defeats itself. The rate of increase is stated to be one degree for 50 feet. That would amount to 105 3-5 degrees for a mile. The semi-diameter of the earth is 3963 miles; therefore at that ratio of increase the heat at the center of the earth will have attained to 418,512 degrees, a condition of matter of which the human mind is incapable of forming any conception. At a depth not exceeding 100 miles all known substances would become volatilized, and the earth instead of being a mass known in the aggregate to be about five times heavier than water, would become merely an immense halloon as compared with other planets. But Major Powell and other geologists will say we do not suppose that the same ratio of increase in heat observable at the surface continues entirely to the center. You do not assign any cause for its stoppage at the point of fusion, consequently you cannot give any logical reason why it should proceed to that degree, especially when scientific deductions approaching very nearly to demonstrable truth teach that it does not do so. Furthermore, you will say that even if the increase of heat does continue to the point of volatilization, the immense pressure of the superincumbent mass of solid crust will prevent the assumption of the gaseous form. Another feature of your theory relating to earthquakes annuls that idea. You say that all earthquakes are primarily caused by the fracture of the thin, solid crust. If the main body of the earth existed as a liquid mass under such pressure as is alleged, whenever a fracture of so thin a crust occurred, a resulting outflow would continue until a normal state of equilibrium had been attained, as a matter of course leaving the matter volatilized by heat in a gaseous form. You say that earthquakes and volcanoes have an intimate connection, and both result from the same cause, namely, fractures of the earth's crust. You say that the fracture of the crust is caused by the interior cooling faster than the surface, thereby producing an interior shrinkage of the plastic or fluid portion to which the thin rigid crust cannot accommodate itself otherwise than by disjunction. You assume that the molten matter ejected from volcanoes comes directly from the interior fluid mass. You say that earthquakes are a constant phenomena, occurring at some point on the earth's surface every hour in the day, that earthquakes are the result of fracture, that fracture is primarily produced by a vacuum between the solid crust and the soft interior, consequently there must constantly exist such a vacuum. Now it is clear that under such conditions there never could exist a single volcano; for there would not be any force to project through fractures to the surface the molten matter which they exhibit. I shall have more to say on this subject in another letter.

JUSTIN CHENOWETH.

TEST OF A GOOD WORKMAN.—An exchange says that fitting a key constitutes a good test of a working machinist's ability. Set 50 men to fitting 50 keys, or splines to the same keyway. When they are all done, you will not find three keys that will fit alike. A key must fit the hole completely, or it is useless. If it bears a ridge here and lump there, or is full of small places, it is of no use. Make a sliding fit on sides of key, and driving fit on top and bottom for most purposes.

NITER PROSPECTORS.—A party of prospectors who understand making the necessary tests will start next week to prospect the alkali flats of this county for niter. There is one section east of the Gillis range in which they feel confident of finding nitrates in large quantities, and should their expectations be realized, another profitable industry will be added to the resources of this county.—*Walker Lake Bulletin*,

Roasting and Leaching of Silver Ores.

NUMBER 4.

[Written for the PRESS by CARL A. SCHENCK.]

The Work of Charging and Emptying

This vat is done by contract; 30 tons, which is about the charge of a vat, fill it up level to the edge of the walls or staves, and it takes four men from eight to ten hours to do this work. The ore is first washed with water, to dissolve base metals and surplus of salt, for which purpose the first wash water is forced to rise through the column of ore from the bottom, in accordance with Mr. O. Hoffman's plan of precipitating silver chloride dissolved in this strong first brine, on the surfaces and in the charge. Two pipes made of inch board—about six inches square in the clear and six feet high, and closed at the end on which they stand in the vat, being also provided with slits 1 1/2 inches high and as wide as the side of the box, one slit to each of two opposite sides, immediately above the bottom board—are placed in the right position before the filling of a vat begins, one box near one corner, the other diagonally opposite. In the column of ore which fills the tank, two hollow spaces are in this manner left out, into which the water is run as soon as the sample is taken, rising in the ore from bottom to top and decreasing slightly its bulk, so that when the water comes at last to the surface and is uniformly spread over it, the charge has sunk down all over, four to five inches from the edge. One of the two streams is now discontinued and the other one led in directly on the surface of ore with such an increase in volume that the strong brine is quickly diluted. To prevent a digging up of the surface by the water under high pressure, it is first led into a box or over a wide and long piece of board, from which it is distributed gently over the ore. The discharge pipe is now let down and turned into the waste trough until calcium polysulphide proves the presence of metal chlorides, when the discharge is turned into this brine trough and conducted into the brine tanks until the reagent mentioned no longer produces in the brine any precipitate. This proves that the soluble base-metal chlorides, with some of the silver, have been washed out of the ore; but a surplus of salt is still present. The discharge is therefore turned back into the waste trough, and the washing with water continued till it runs from the ore with a fresh taste and shows a density of one-half degree—not more—on being measured with Beaume's hydrometer. In the meantime, the brine tanks have been precipitated by calcium polysulphide, the required amount of this reagent having been previously and approximately determined upon by a test, the last small quantities needed being ascertained by one or more tests during the process of precipitation.

The water having been turned off from the leaching vat after washing out of base metals and salts, which operation takes about 12 hours, the surface of the ore is soon uncovered and gets dry enough to walk upon, when it is once more leveled off for the subsequent introduction of hypo, which is turned on when the gradually decreasing discharge into the waste-trough is not thicker than a common lead-pencil. The hypo, now turned on in a full stream, is also received from the mouth of the pipe in a box for a quiet distribution over the surface. The hypo in working its way through the ore displaces the last portion of water, wherefrom this part of the process is called "the changing from water to hypo."

The Change from Water to Hypo.

Or the determination of the time when the discharge running into the waste-trough has to be turned into the trough leading to the precipitation vats, is of importance, as will appear from the following reasoning:

The thin stream of waste water increases again in thickness after the hypo has been turned on; the hypo displaces the water, and if the first descends uniformly through the column of ore in the vat—the ore not being more packed in one place than in others—that time has now to be ascertained when all the fresh water, mixed with but very little hypo, has run out and is followed by a full discharge of pure hypo. And if this moment is not determined with that precision which the nature of the case permits, too much hypo, already carrying perhaps silver, will be lost; or, the discharge being turned too soon into the precipitating vats, dilutes the hypo solution. Preliminary conditions for fixing the moment are:

1. Equal density of the column of ore in all points of the same level, wherefrom it becomes obvious that all lumps which, moreover, cause losses in other respects, should be separated in charging a vat.

2. The filter should be so constructed that the solution to be filtered does not need too much time in passing through it, and so that the filtrate may freely run out, which is not the case with a rock bottom, where, moreover, small portions of the filtrate may be retained in the nooks and corners, which in being washed out in the progress of the work may cause mistakes and losses. (It has been within the writer's experience that the first wash water running from a new charge and rock bottom had all the taste of a strong silver solution.)

In regard to the means in use for determining the change from water to hypo, or, in other

words, when the discharge is turned from the waste-trough into the hypo-trough, the operator is guided by the taste and a few chemical tests. The discharge must show a peculiar taste, characteristic to the calcium hypsulphite, not sweet, which would be going too far, but quite different from the taste of fresh water; a drop of lead acetate must produce a peculiar and sufficiently copious precipitate quite distinct from that in fresh water. Calcium polysulphide is also used to precipitate such amounts of dissolved silver which are yet too small to be detected by taste, which test then would indicate that dissolving of the silver has started, that pure hypo with little silver has displaced the water, and that it is high time to throw the hose from the waste-trough into the hypo-trough. But

All These Teets

Are only of value in the hands of an experienced and conscientious operator, and they do not, after all, give us that nice precision which we would like to have, but which from the nature of the case we cannot expect, the change in the composition of the discharged stream, from water to hypo, not being so distinct as one might think. Mr. Stetsfeldt comes nearest to a complete solution of the problem involved, making the work, moreover, independent of individual qualities. He determines the volume of water which is held back in the drained but yet saturated charge and then runs in by portions the same volume of hypo; all the water is displaced by hypo when the same volume of the latter has been run in and in its gradual descent just disappeared under the surface. The hose is now thrown into the hypo-trough and a full stream of hypo turned on.

What is said here about changing from water to hypo holds also good in the following

Change from Hypo to Water.

The solution from the discharge pipe, running in the hypo-trough, soon gives a sweet taste—not agreeably sweet, but rather offensive and increasing in strength, until, at last, a maximum of taste is obtained, whereupon it gets weaker and weaker, disappearing with the hypo leaching. It takes from 24 to 30 hours to leach a 30-ton charge. Pure hypo is now continuously run in from the surface, while the hypo containing silver is drawn off from the bottom and conducted through the hypo-trough into the precipitating vat which was drawn off last. The surface of the ore under leaching must now always be well covered with hypo, and the discharge pipe is clamped if from whatever cause the supply on top is not equal to the outflow. Frequent tests with calcium polysulphide should also be made, to watch the gradual increase and decrease in richness, and the stream of hypo must be shut off when all the soluble silver compounds have been washed out of the ore, which again is ascertained by tests. As soon as the surface is now dry enough to walk upon, the thin black layer of silver sulphide on top, which has been deposited during the leaching, is scraped off with care, whereupon the tailings sample is taken. It is necessary to anticipate in order to explain the nature and presence of this thin layer. After the precipitation of the silver, the silver sulphide is given time to settle; the renewed hypo is then drawn off into the sump or settling tank, from which it is pumped up into the storage vat; but the settling is not so perfect that the lightest and most minute particles of the precipitate can go down in time to the bottom; they will remain floating in the liquid for hours, longer than in practice can be allowed to the settling. By the work of stirring, which is required at each precipitation, the accumulated precipitate is also more or less stirred up, so that it will cause by division the formation of more of these floating particles. They flow out with the hypo into the sump, where only a portion can settle; the rest is also pumped up into the storage vat and carried from there with the hypo over the charge under leaching. The ore acts now in respect to them like a filter, so that in the course of the leaching this thin black layer is formed. After scraping it off, whereby it gets unavoidably mixed with some sand, it is wheeled away to a place of storage for further treatment.

After turning off the hypo on top the outflow begins to decrease, and if it has at last dwindled down in size to the thickness of a penholder, fresh water is again turned on to wash out the last portions of hypo. The discharge is led into the waste-trough, and the water turned off on top, when the hypo has been displaced by water. About half an hour later the tailings are dry enough to be shoveled out and wheeled away to the dump. The rock bottom, which consists of smaller stones in its upper part, should not be disturbed in this work, and the cautious care which the shoveler takes, when he thinks he is near the rock bottom, gives rise to

Another Drawback in its Use.

A very thin crust of ore may be thus left in the vat; in the course of time it gets hard, increases in thickness and retards at last more or less the filtering and outflow of the solution.

The troughs for conducting waste water, silver solution and brine are made of lumber and placed parallel to the line of vats at the foot of a long stone wall, which in height reaches from the top plane of the precipitation vats to the level of the car track. Each solution has its separate trough; the one for waste water is of V shape and nearest to the angle of the stone wall; next to it is the narrow brine trough, square in section, upon which follows the wide and deeper hypo-trough, also square,

The latter is made deeper and wider than there may be always ample room in it for the silver solution, for instance, if two or three tanks are running. Square openings of liberal size are left out in the wall to make room for the discharge pipes.

Precipitation.

Four round tanks built of pine staves and well bound with iron, 16 feet deep and 14 feet diameter (these dimensions are given from memory and may not be quite correct), are in use for receiving and precipitating the solution of silver. [See engraving.] They stand in a row parallel to the line of upper vats, but so much lower as need be, to receive the discharge from the latter. The difference of level between these two systems of vats is therefore determined by the outside height of the upper vats plus the depth of the hypo-trough. The hypo-trough is laid over the line of lower vats inside those points of circumference which are nearest to the stone wall, and is provided with holes in its bottom, one for each vat, from which the solution drops into the receiving vat beneath. When out of use, these holes are closed by well-fitting wooden plugs.

The precipitation vats are numbered from 1 to 4; they are only filled to within 1½ feet from the top. When No. 1 is full, the stream of silver solution is turned into 4, which has been drawn off while 1 was filling; the silver of one must now be precipitated; No. 2 is the last one which has been precipitated and is settling;

the hypo. This small amount is not lost, and its presence is a sure proof that the reagent is out in excess. In this manner the operator approaches and gains his point, slowly, perhaps, but surely. If, by mistake, too much of the calcium polysulphide has been used, so much of the silver solution must be run in as is needed to neutralize this excess. This is not only a very tedious operation in causing loss of time, especially when the solution is weak; the precipitate formed in an overprecipitated vat by running in more silver solution is also of such a nature that it only settles after a long while. But this excess must be balanced by all means, as it would, if remaining in the hypo, cause a direct loss in the leaching vats. Vigorous stirring is of the greatest importance to do quick and satisfactory work. The time of precipitating a vat is in the average about half an hour, and the number of piles of this reagent, the density of which is about equal to 12° Beaume, varies with the varying richness of the solutions to be precipitated, from ¼ to 30 and more being needed, the vat into which the cream of the leaching was run requiring the highest amount. The time allowed for settling of this precipitate should never be less than four hours.

Return of the Regenerated Hypo to the Storage Vat.

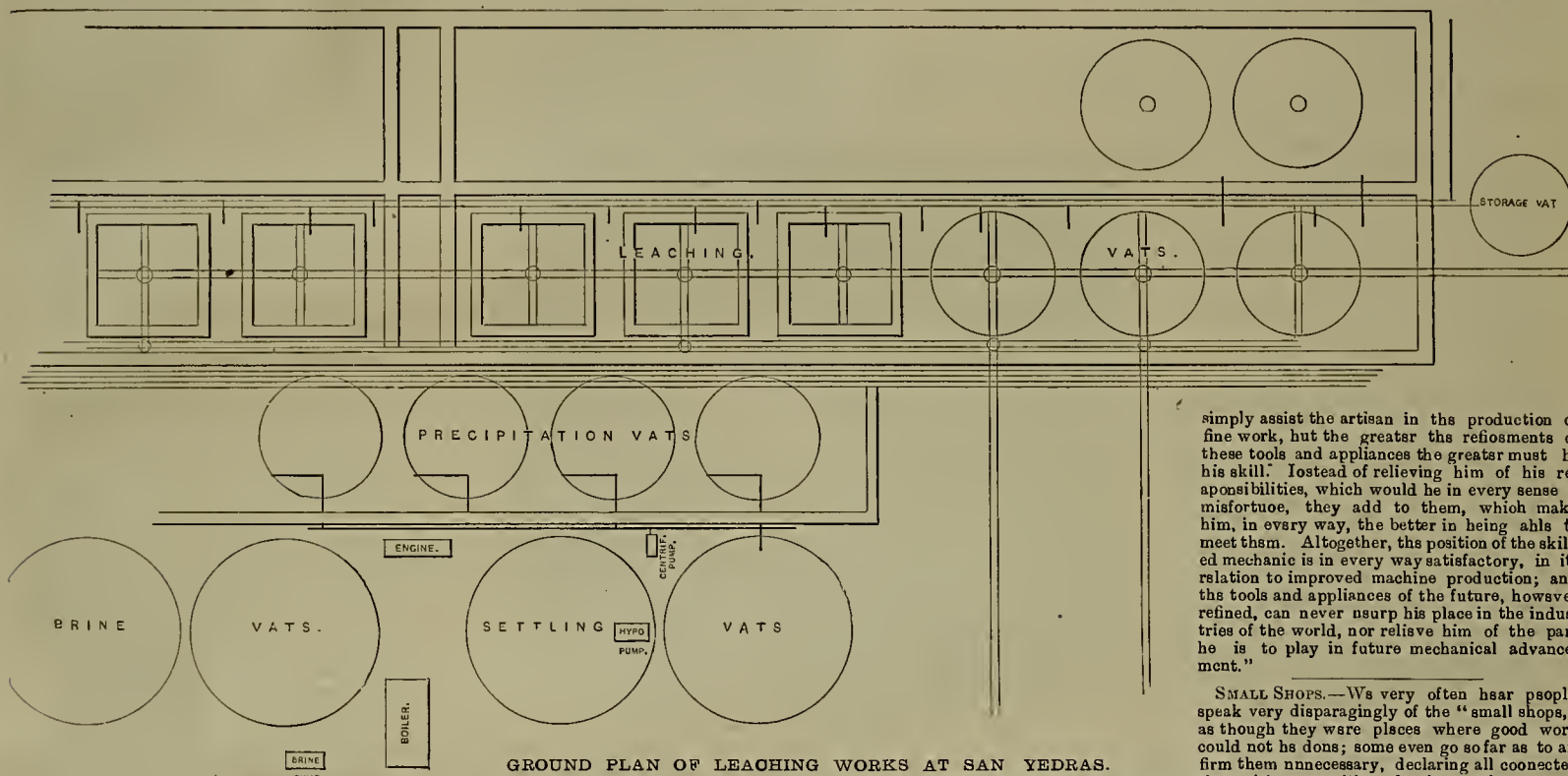
For the purpose of drawing off the hypo after the settling of the precipitate, a hose was first employed with a float attached to its inner end,

after the settling of the precipitate is now quick and easy; to start with, the open end of the pipe is simply lowered a couple inches under the surface of the hypo, to be lowered again when the liquid has sunk correspondingly, and so on until at last the pipe is in a horizontal position three feet above the bottom of vat. The drawing off is now completed and new solution can be run in, not forgetting that the pipe has to be raised before this is done.

The hypo drawn from the precipitation vat in the aforesaid manner flows, before entering the sump, into another horizontal pipe, which extends along the entire length of the vats, so that the four short pieces, one to each vat, which receive the discharge from the swinging pipes, form connections between this long pipe in front and the latter. The renewed and settled hypo does consequently not flow directly into the sump, but is led into this intermediary pipe, which has only one outlet to the settling tanks, namely, another small two-inch pipe, screwed into it at right angles, being an extension of the connection with vat one. In this manner the discharged liquid from precipitation vat No. 4 flows through the entire length of the intermediary pipe before falling into the sump, that from 3 has a shorter distance to run, from 2 still shorter, whereas from 1 it flows right into the sump, this outlet pipe being here the extension of the connection with 1. Valves are placed at each point where a connecting pipe enters the intermediary main, from which, at

Skilled Mechanics.

Speaking of the position and prospects of the skilled workman and mechanic, the *American Machinist* remarks: "No matter to what extent the refinement in machine tools may be carried, it is in the end the careful and painstaking operation of the skilled mechanic that must bring the products of these tools to a perfection that will meet the requirements of modern demands. The latter will not turn so round that, in this respect, its production cannot be improved by the hand work of the skilled machinist, nor will the milling or planing machine produce surfaces so true that he is not called to rectify them with file and scraper. Now, as ever, the beautiful finish on iron and steel is the result of the individual effort of the operator, rather than of the perfection of tools. Years ago, the opinion prevailed to a considerable extent that the services of the highly skilled mechanic would not be so much a matter of necessity in the future as in the past, but those who built such ground built poorly. The man will always be superior to the machine, and must always see better than he can perform. One man may direct the efforts of 50 skilled workmen to the production of good work, but 50 men cannot get good work from one unskilled workman. Improved tools and mechanical appliances will



No. 3 is ready for drawing off and new solution runs into 4.

To ascertain about how much calcium polysulphide is needed,

A Test is Made

Before commencing the precipitation of a filled vat. A glass full of the solution is dipped out for the purpose and the silver in it precipitated with care by adding the reagent in small portions, with good stirring after each addition until the solution is passed, as it is called, or, in other words, till all the silver has been thrown down in the form of insoluble sulphide. With a little practice it is not difficult to ascertain this point; small particles of silver sulphide float on the surface, while the bulk of the black precipitate curdles and sinks quickly down to the bottom of the glass; a drop in excess of the reagent makes the liquid look like diluted milk, and is, moreover, detected by the smell, which is peculiar to sulphuretted hydrogen, but which is not perceptible as long as no excess is present. From the number of drops used in this test and from the mass of precipitate formed, the operator calculates now approximately, and, by the rule of experience, the number of piles which he needs to precipitate the vat in question, avoiding by all means an estimate which should be too high. After pouring in the volume of the calcium polysulphide so determined, the solution is well stirred by two men, and after about 10 minutes a second test is made, to ascertain if enough, or too little, or perhaps too much, of the reagent has been added. For this purpose a glassful is again dipped out and filtered and the filtrate examined as described before. If there is cause of fearing that too much of the reagent has been used (that the solution has been overprecipitated), even the slightest excess that can do harm will be detected by a drop of lead acetate, which produces a lighter or deeper brown color, according to the amount in excess. But if, on the other side, it is shown that more of the precipitant is needed, the second test will also show how much more has to be used, not forgetting in the last estimate the practical rule that a little silver may be left in

so that it could only draw from the surface. But the work of drawing off with this arrangement being too slow, another plan was adopted to solve the problem on hand, which from the nature of the case had to satisfy three distinct conditions:

1. The renewed hypo after settling has to be drawn from the surface, but quicker than this is done with a floating hose.
2. Ample room must be provided in this vat below the point of discharge of hypo, for the accumulating precipitates, which from cleanup to cleanup—about one month time—must have room to settle on the bottom of vat.
3. At the time of the cleanup the precipitate mixed with hypo, having the physical nature of a black slush, has to be pumped to the draining vat.

About three feet above the bottom of each vat and opposite to the inlet in hypo-trough, a 2-inch iron pipe is drawn horizontally through the side, and has a revolving hollow arm attached to its inner end; this horizontal pipe is stationary and cannot turn, but around its inner end the hollow arm can easily be turned in a vertical plane through the volume of the cleared hypo, describing in this movement a quadrant. When this hollow radius is not in use, it is drawn up to a perpendicular position, so that its end stands about six inches above the surface of the filled vat. After precipitation and settling, this arm is let down by degrees, drawing only from the sinking surface and discharging through the horizontal part into the sump or settling tank. By means of an iron rod, which with one end is clamped to the end of the swinging pipe and is provided with a ring at the other, the swinging pipe can be let down and hauled up with ease and held stationary in any required position. For this purpose, and also for walking, a plank is laid across the vat, close to the end of a pipe, when it stands in an upright position and parallel to the place of the circle, which it describes when in use. By slipping the ring of the rod over any one of the line of nails, driven half-way into the side of the plank, the swinging pipe can be held in any required position. The work of drawing off a vat

about the center of its extent, another short pipe starts off to connect with the centrifugal pump. The hypo outlet during the cleanup can be closed by a cap screwed into it. It may not be out of place to point out the practical gains derived from this described arrangement:

1. Hypo as well as precipitate are removed by the same intermediary pipe.
2. Each vat is in independent communication with the clean-up pump, common to all, by opening its valve and closing the others, the aforesaid cap being screwed on.
3. The hypo from all the vats runs into the sump by one outlet common to all.
4. A full vat can be partially drawn off into another one by letting down the swinging pipe of the first a couple inches under the surface and that of the second more, the cap being also screwed on, in which case the hypo from the first will flow into the second. This is of importance in the work of correcting mistakes from overprecipitation, especially if the silver solution on hand, that can be used for rectification, is weak.

The Sump.

Two round settling tanks placed side by side receive the regenerated hypo from the precipitation vats. They communicate by means of a short horizontal pipe so that the liquid stands in both always at the same level, as long as the surface has not sunk below it. Into one of them, the receiver, the hypo runs, first striking a dashboard, which rises and falls with the changing level. Much of the floating precipitate settles on the bottom of these two vats. The hypo-pump, worked by steam as all others, is placed over the second vat and delivered to the storage vat from which the hypo is conducted into the leaching tanks. The bottom of the storage vat is elevated about 10 feet above the top plane of leaching tanks, so that a rapid outflow of the solvent for distribution over the ore is thereby obtained. The hypo-pump works day and night, with very little interruption, to keep up the supply in the storage vat.

A BRANCH of the Topolobampo colony enterprise is being organized at Los Angeles,

simply assist the artisan in the production of fine work, but the greater the refinements of these tools and appliances the greater must be his skill. Instead of relieving him of his responsibilities, which would be in every sense a misfortune, they add to them, which make him, in every way, the better in being able to meet them. Altogether, this position of the skilled mechanic is in every way satisfactory, in its relation to improved machine production; and the tools and appliances of the future, however refined, can never usurp his place in the industries of the world, nor relieve him of the part he is to play in future mechanical advancement."

SMALL SHOPS.—We very often hear people speak very disparagingly of the "small shops," as though they were places where good work could not be done; some even go so far as to affirm them unnecessary, declaring all connected therewith an unmitigated nuisance; but except in those instances, happily extremely rare, where the proprietors of these little foot-power shops, by virtue of low rents and other expenses, take large jobs at a very low price, the small and unpretentious shop or factory is of importance not second to the large ones employing the hundreds of artisans. It is in these little affairs where the most important mechanical and engineering achievements have had their origin. In them the dirty, begreased amateur has worked out some of the most complex problems of the age, though in the great majority of instances the financial results of his toil and skill, money-bags having reaped the reward. Nevertheless, the stubborn facts remain that a great proportion of the most important mechanical discoveries of this marvelous century can trace their origin to this humble and unpretentious source—the cold, damp basement, or the dingy garret containing the little shop. Without the little shop many larger ones would have never been built, and without them very many massive engines would soon have little or nothing to do. All honor to the little shop.

THERE'S NOTHING LIKE LEATHER.—The day will come when the present mode of protecting the foot of the horse will be discovered to be a mistake. Its horny substance was never intended to be pierced by nails. No wonder so many horses fall lame and are perpetually ruined. We were recently shown a horse shod in leather. It struck us as an excellent idea and worthy of adoption. We should not be surprised to learn that leather shoes had superseded shoes of iron. If, however, iron be a necessity, let it be nailed on the leather shoe. Now, shoemakers, please get up a neat set, and show them to all your horse friends. Don't take "no" for an answer; stick to them till you have overcome their prejudices. When you have succeeded, apply to the Society for the Prevention of Cruelty to Animals for a medal, and if they decline to give you one, be content to know that you have done more good than the society in question with all its wealth, Scottish Leather Trader.



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W. B. EWER.

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Saturday Morning, Jan. 22, 1887.

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Passing Events.

The long expected and very welcome rain has come at last in abundance, and has extended all over the State. This has greatly encouraged the miners and farmers who were fearing a "dry year" for California. In the cities, too, it is welcome, for it improves the health of the community by flushing the sewers and generally purifying the atmosphere.

The curious accident to the schooner Parallel, when 40 tons of powder exploded upon her striking the rocks, is referred to elsewhere.

The Legislature this week elected George Hearst, the well-known mining man, U. S. Senator, to represent California for the next six years.

The rain will set the streams and ditches flowing full again in the mining regions, and start work in many localities.

Reports from the quartz mines of the State are very encouraging, for in all directions old mines are being reopened and new ones being developed.

"FATHER" UPCHURCH, the founder of the Ancient Order of United Workmen, now so well known all over the United States, died this week.

The sawing machinery at the Inyo marble quarry is now in operation, and further additions to the plant are being made,

Time to Look After the Prospects.

We have had a good deal to say of late about the gold mines of California—their extent, varied characters, accessibility, richness and the other generally favorable conditions under which they exist. We recur to this subject now with a view to enlarging a little upon a topic heretofore partially considered, viz.: the purchase by investors of undeveloped mines instead of improved and productive properties. We have repeatedly explained how, under the liberal provisions of the laws regulating the disposition of the public mining domain, it becomes possible for the prospector and the miner to take up and hold numerous claims, on which no more work is done than suffices to secure to the locator possessory title to them under the local regulations and general laws. This, as a rule, is all the work these parties do, or ever purpose doing, on these claims, first, because, as a general thing, it is all they are able to do, and secondly, because their object in taking them up was in the first place to simply hold them for sale, and this they do from year to year, performing annually enough work to keep good their possession, and sometimes perhaps a little more.

Now there are in California thousands of vein-mining claims in just this position, and which, having been taken up not for mere speculative purposes, but to sell, may be supposed to possess more or less merit. There is no better judge of mineral indications than the professional prospector or practical miner. So far as surface signs go, his opinion is worth fully as much as that of the schooled mineralogist or the trained expert. When, therefore, he makes and records a location, and afterward thinks it worth while to perform upon it annually \$100 worth of work to keep good his claim to it, we may safely conclude that there is something in it. There is ore there or pretty good evidence of its existence in the neighborhood, to say the least. We never knew a miner to take up a location of a quartz vein and spend \$100 on it without something to warrant it. Such a thing as this, in fact, hardly ever occurs.

Now it is to this class of properties investors should, it seems to us, turn their attention, instead of persisting in their search after productive mines, or "going concerns," as the English term them. A mine well exploited and equipped and earning large net revenues is undoubtedly a good thing to have. But these, wherever we find them, are costly properties, being not always held by parties who wish to sell them at a large sacrifice. They can, in exceptional cases, and sometimes for special reasons, be bought at a bargain, as was explained in these columns not long since. As a rule, however, purchasers must expect to pay for them about all they are worth; our business sense teaches us that this necessarily must be so.

With undeveloped mines, on the other hand, it is quite different. They are on the market. They were located to be sold. The owners are willing to sell them; are, in fact, always on the lookout for buyers. In their present condition they are a source of no income to the owners, nor have the latter the means to bring them into a productive condition. In most cases they are a drain on the slender resources of the miner, and one that he would very often be glad to get rid of. For this and other reasons he is therefore almost always willing to part with his interest in them for a trifling sum—a mere modicum of what a "going concern" would cost.

In buying these prospects there accrue to investors other advantages besides the small amount of purchase-money paid out. Mining is a progressive business. Work can be done cheaper and better this year than it was last. Every year brings with it also other improvements in the shape of perfected machinery, more efficient processes and valuable inventions. Economies of labor and expenditure are all the while being effected, the advantages of which they who have work now to be done or improvements to be made enjoy to the fullest extent. All that has been gained in years past inures to their benefit. A mill put up now is capable of doing more and better work than one put up five years ago. It costs less to sink a shaft or run a tunnel now than it did then. Freight, labor and material are also somewhat cheaper. Hence the investor about to embark in quartz mining may reap a large aggregate of gains if he choose to take a fresh start and do his own

work. Not only so, but being warned he may avoid repeating the mistakes of the past, and which, if made by his predecessors, he will have to pay for. These danger signals, so set for his guidance, will also be worth something to him.

Again, in pursuing the course here suggested, the buyer need not confine himself to the purchase of a single claim, as he would, most likely, have to do were he to buy an already producing mine, but could obtain several prepossessing of this kind, thereby increasing and almost insuring his chances of getting one or more good ones. This is a consideration of moment. As an additional precaution against the occurrence of an ore dearth, it would, in fact, be well for every company to insure an extra claim or two, where this is practicable, and keep exploratory work in progress on the same.

We are fully satisfied that the time has arrived when there should be taken a new departure in the direction here pointed out. Such departure is inevitable, nor can its advent be long delayed. To suppose that these sure sources of wealth, of which we have so many in this State, can continue to be neglected is preposterous, and when they shall be made practically available, as they seem will be, there will ensue such an expansion of quartz mining as we have never dreamed of. When this shall happen there will come an end of hard times in California. New breath will be breathed not only into the business of mining, but also into every other industry in the State. Let it be borne in mind that we have on this coast reached the day of small things, not only in other pursuits, but also in mining. Having gone for the high properties, our capitalists must now go for the little ones as well; we make this point for their especial benefit.

Experiments With Slimes and Tailings.

A series of experiments have recently been made by Dr. J. H. Rae in the direction of an investigation into the influence of electricity as an aid to amalgamation of silver. As a laboratory experiment he has been able to save 95 per cent of the quicksilver in slimes and tailings, and hopes, when working on a large scale, to be able to save 50 to 75 per cent. He tells us, however, that he is not positive yet that his idea will be successful when applied practically. However, the Douglas tailings mill, in Nevada, is putting in a dynamo to furnish an electric current with which to put the matter to a test.

He has thus far made 23 experiments on slimes and tailings from the settlers. Some of the amalgam recovered has been shown to the editors of the PRESS. The slimes carry off a great deal of good silver. The amalgam coming from the slimes he tells us is a finer metal than that recovered from the tailings. A number of millmen have been interested in these experiments. He thinks that by his system the currents of electricity can be applied to any ordinary quartz mill as now constructed. We shall be advised more fully when the experiments at the Douglas mill have been completed. The system is to be applied directly to the mills during the ordinary process. The experiments, so far, have been confined to tailings and slimes taken from the bed of the Carson river, most of it being a gray, dirty, greasy slime.

Annual Mining Review.

We shall publish next week a 24-page edition of the MINING AND SCIENTIFIC PRESS, containing a review of the mining industry for the past year. We publish it late in the month in order to obtain full statistics for the year. We propose not only to give a full account of the mining progress in California, but also the condition of the industry in Nevada, Arizona, New Mexico, Utah, Idaho, Montana, Colorado, Oregon, Washington and Alaska. The review will give, in condensed form, the statistics of production of the mines and some account of the condition of the various camps. We shall publish a larger edition than usual of the PRESS containing this review, intending to send extra copies to the various mining camps all over the coast. A comprehensive review of this great industry, such as we intend to publish, will be useful for reference hereafter, as well as of present interest and value. Those interested in mining should procure copies to mail to those friends who would be likely to appreciate such information.

"Strakes" for Saving Gold.

A few weeks since we gave a description of the old blankst system used in quartz mills in this State for saving gold, before they began to amalgamate in the battery and use silver-plated amalgamating plates. The use of these blankets was probably the development of the old bullock skin for saving gold, much in vogue in South America, and some description of the methods employed there will interest our gold miners. At the famous Merro Velhe mines in Brazil, the slimes and water issuing through the battery screens have added to them a certain amount of clean water, and are then conducted over inclined platforms or sluices about 18 inches wide and from 27 to 35 feet long, with a fall of one inch to the foot. The first 16 feet of these "strakes," as they are called, are covered with bullock skins two feet two inches long, and of the width of the strake, tanned with the hair on them; a series of baize cloths, each two feet ten inches long, are employed below these, which are again followed at the lower end of the arrangement by another series of overlapping skins. A certain quantity of finely divided gold is caught even on the last of these skins, while about 10 per cent of the amount present is carried off in the water.

The skins and strips of baize are removed and washed at intervals during the day and night, and time allowed to intervene between each washing up depending on the nature and richness of the ores treated. In each of the houses erected over the strakes are boxes or tanks in which skins and baize are carefully beaten and washed, and of which these destined for the reception of the most concentrated slimes are divided by partitions into three separate divisions. Into one of them the first three skins from the upper end of the strakes are washed, and into the second is removed the ore collected on skins 4 and 5 of the series, while the third division contains water in which the final washing of skins 1, 2, 3, 4 and 5 is effected after having previously removed the coarser particles in one of the other divisions.

The skins and cloths below No. 5 are washed in the same way, but into separate tanks, from which they are subsequently removed and washed over another series of skins and cloths in order to effect their further concentration. The deposit on the first three skins, known as "head-sand," amounts to about 0.42 of a cubic foot per ten of ore stamped, and contains from 27 to 30 ounces of gold per ton, all of which, with the exception of about one ounce, is in a free state. The sand is sent without further preparation to the amalgamating-house.

This "middle-sand" consists of the deposits collected on the skins Nos. 4 and 5, and contains about 6 ounces of gold to the ton, of which some 16 dwts. only are mechanically combined with particles of pyrites. This sand is further enriched by being washed over another system of strakes.

The deposit taken from the third compartment of the tank in which the upper five skins are finally washed is called "swim-sand," and, being exceedingly fine, could not be safely subjected to concentration, and is consequently sent with the head-sand directly to the amalgamating-house.

All the products caught below the fifth skin are known as "tail-sands," and are, like the middle-sand, concentrated by being washed over a second system of strakes. The apparatus employed for this purpose consists of three strakes, each covered with four skins and seven cloths.

At some of the Brazilian mills the skins and cloths are changed every hour, while at others it is only done once in two hours. Previous to 1854, the strakes above described constituted the only arrangement for the collection of the auriferous materials issuing from the batteries, but in that year some extra strakes were added, as it had long been known that a considerable part of the precious metals passed off in the slimes. These extra strakes are so fixed as to receive the slimes from the lower end of the original ones, after being first diluted by the addition of some clean water, and the sands collected are subjected to amalgamation without further concentration. The saving of gold effected by these additional strakes amounts to about 38 ounces per month.

It may be remarked that straking, on the whole, is considered a cheap and simple process, by which 67 per cent of the gold originally present in the ore is obtained in a highly con-

concentrated state, while the 33 per cent that escapes is in two distinct forms; that is, light, free gold and gold inclosed in the coarser particles of pyrites. The light, free gold generally escapes by floating off, while the pyrites are separated and subjected to another treatment.

Manufacturing Chemistry.

Industrial progress appears in an extraordinary degree in the advance made by applied chemistry during the present century. Scientific research has opened a wide field for the application of many new and valuable compounds, and has also reduced the cost of many chemical products, rendering some hitherto unimportant chemicals convenient and economically available, and enlarging the applications of others already in use. Chemistry has unlocked the treasures of the earth to enrich the soil, to beautify and render complete our homes, to clothe us, to cure or relieve the sick, to preserve health by cleanliness and purification and to supply the means of illumination. The rapidity with which the experimental discoveries of the scientist are adapted to practical purposes is, at times, astonishing to the investigator himself. Beside the utilization of our natural resources, the waste products of manufacture are the constant subject of investigation, and often interesting and valuable products result therefrom. The debt of various branches of art and manufacture to new and improved methods of modern chemistry can hardly be overestimated. Chemical processes and products are, indeed, so intimately associated with nearly all manufactures as to be inseparable, and therefore it becomes a difficult matter to locate accurately the dividing line where manufacturing chemistry ends and purely mechanical operations commence.

If one will look over the ponderous volumes of the Census Reports issued by the Government, he will see much to surprise him in this connection. The advances that have been made of late years in this country are remarkable. Leaving aside the preparations of drugs, pharmaceutical mixtures, etc., there are described the chemical processes connected with manures, soap, candles, glycerine, white lead, colors, products of petroleum, etc. There are chemical processes connected with the manufacture of glucose, soda, phosphates, sulphur and sulphuric acid, potassium bichromate, potash, phosphorus, borax, bromine, nitro-glycerine, and many other things.

New York is, of course, the center of the chemical industry, and San Francisco comes number ten on the list of cities in this country. There are 33 establishments of this class in San Francisco, with a capital of \$2,297,550 employed. Among others may be enumerated the following more prominent substances treated or made in this State: Castor oil, candles, oleic acid soap, hard and soft soap, glycerine, nitro-glycerine, borax, white lead, salts of lead, and sulphuric acid. It is probable that before long soda-salts will be produced in California, as investigations into that subject are being carried on.

A Remarkable Explosion.

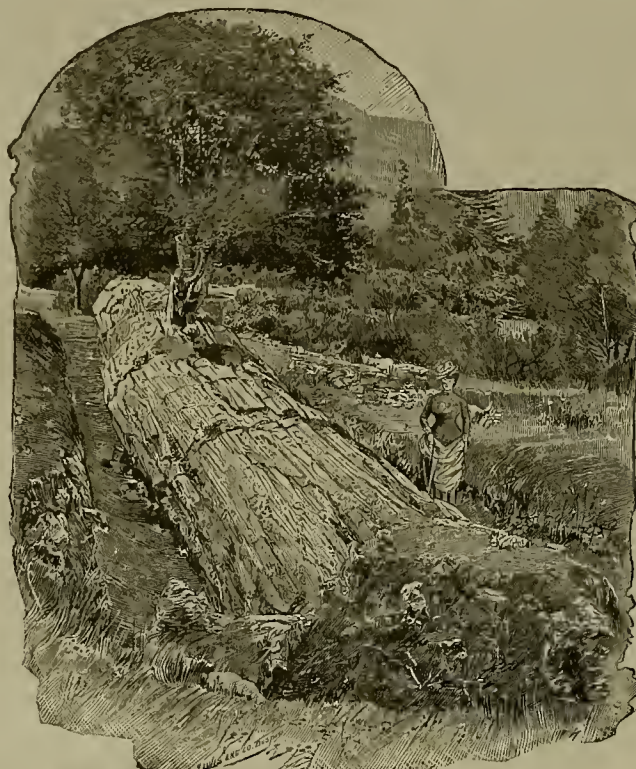
The wreck of the schooner *Parallel*, near the Cliff House, last Saturday night, was a remarkable one. The vessel tried three times to get through the Golden Gate and out over the bar, but the heavy sea and light winds compelled her to return and anchor. Finally she got outside, when the incoming tide and heavy sea forced her down on to a lee shore in the night-time. There was no wind, and the crew, fearing disaster, took to the boats and left the vessel. She drifted on to the rocks and began pounding to pieces. While in this condition, 40 tons of giant powder, which formed part of her cargo, exploded, completely destroying the vessel, and shattering the signal station, Cliff House, and other dwellings ashore. Several of the life-saving service men were injured, but none fatally.

Such an occurrence is a remarkable one. Giant powder does not explode by ordinary concussion alone, as has been abundantly proven, by experiment, scores of times. The fact was finally discovered that there was a box of giant powder afloat, too. It must have been that the blows of the vessel on the rocks discharged these caps, which in turn exploded the powder. This is the only theory of the acci-

dent that seems tenable. The only other reason that could well be given would be that repeated blows on a box of the powder had squeezed the nitro-glycerine out of the powder, so that a final blow exploded this, and the whole mass was fired by this explosion of the free nitro-glycerine. Giant powder will stand several heavy blows, but many repeated strokes will force out the nitro-glycerine, which then comes dangerous, as alone it will explode by concussion. When, however, this substance is held by a proper absorbent, as it is in giant powder, the absorbent protects it from explosion, except by special means.

The Petrified Forest.

One of the most interesting natural curiosities in this State is the petrified forest, which is only a few miles from Calistoga, Napa county. The name is somewhat misleading, as the number of trees is not very great and none are standing erect. They are all lying down like that shown in the accompanying engraving, which we take from Major Ben C. Truman's new book describing the Sunset route of the Southern Pacific Company, a beautifully illus-



A PETRIFIED TREE, NEAR CALISTOGA, NAPA COUNTY.

trated volume. The trees in this petrified forest are scattered over an area 500 yards square, and others are found at intervals on the ridge down nearly to the bay, a distance of 25 miles. No branches are found and none of the trunks are long. There are many fragments, and the petrification is complete. The woody fiber has entirely disappeared and has been replaced by a grayish stone that seems to be mainly carbonate of lime, in which the grain of the timber is distinctly preserved. The petrifications split readily with the grain, and numerous splinters lying about resemble wood rather than stone until they are picked up.

All the stone trunks are broken across transversely, some of them in pieces not more than a foot long, on an average, with a squareness of fracture suggesting that after petrification they must have been thrown down. No other explanation will account for the fact that all have numerous transverse breaks, cutting squarely across the trunks, with no appearance of having been crushed. No timber could possibly be broken in such a manner; the breaks must have occurred in the stony condition.

The rock of the ridge is a volcanic sandstone, and was formed by the solidification of wet sand thrown up by a volcano, or washed down from its sides. Such a flood of volcanic sand filled up an ancient forest to a depth of 20 feet or more; the trees rotted away; those parts above the surface of the sand disappeared; those parts below the surface were replaced by stone deposited in water which trickled down; this petrification was harder than the surrounding sandstone, which was washed away; the petrified trunks, left without support, fell down and

were broken into numerous fragments, and there they continue to lie, and to tell of wonderful events that happened thousands of years ago.

The trees were redwood, of the species which still grows in the same vicinity.

Another petrified forest, similar to that near Calistoga, is found in the valley of Cedar Creek, in the northeastern corner of the State.

New Ore-Crusher.

In the ore crusher patented by Frisak A. Huntington, of this city, in August, 1885, he used a loosely rotating cylinder in combination with a stationary jaw, between which and the cylinder the material is crushed. He has improved this construction and has just obtained a patent through the MINING AND SCIENTIFIC PRESS Patent Agency, and the jaw is now formed with or mounted upon a suitable supporting-base, so as to be either stationary or movable. The face of the jaw is curved, the middle portion being an arc of a circle, described about the center, which forms the fulcrum for the lever or arm, upon the end of which

Foundry Notes.

The Joshua Hendy Machine Works have just finished steel boilers for the fog signal at Point Montara, below Half Moon Bay, to replace those formerly in use. They have also finished steel boilers for the Fog Signal Station at the Point Arena lighthouse, Mendocino county. New boilers and a larger fog signal have been made for the station at Yerba Buena island, in this bay. These contracts were awarded by Capt. A. H. Payson, who is the engineer in charge of the lighthouses and fog signals in this lighthouse district.

Experiments are still being conducted at the North Bloomfield mine in raising gravel by means of a hydraulic elevator. The machine supplied by these works has succeeded in raising gravel 85 feet with a pressure of 425 feet of water. They recently sent a large 20-inch gravel elevator to Elma mills, Siskiyou county, to be ready for the opening of the water season. There are two of them at Golden, Colorado, and for one, new and larger pipe is now being made here, in order to give a larger supply of gravel to the machine, so as to apply its full capacity.

A Cummer engine is being put into the flouring mills at Woodland, Yolo county. Part of its duty will be to run the dynamo for electric lighting. The engine is especially adapted for flour mill and electric-lighting purposes, being steady and uniform as well as economical. These engines have also been supplied to the San Luis Obispo flour mills to run the mill and an electric light dynamo.

We are informed at these works that the business in ore-feeders for quartz mills and in Triumph concentrators has been exceedingly good during the past year and still continues. General business has also been good, and is now even showing some increase.

Extraordinary Copper Production.

Dr. Trippel, superintendent of the Old Dominion Copper Company, at Globe, Arizona, has kindly furnished us the following data in regard to the run of one of their furnaces for the first eight days of the present month, which will be of interest to all copper-producers:

	Tons.
Ore smelted.....	415
Coke consumed.....	53½
Copper produced (running 98 fine).....	81

The above shows an average of 51 tons of ore smelted per day, with a consumption of 12.9 per cent of coke per ton of ore, and the ore averaging 19.5 per cent in copper. The last day's run was 55 tons of ore, producing within a fraction of 12 tons of copper.

The results here given, we may state, are but little above the general average of production from the works mentioned. The above statement is based upon the operation of one 30-ton Pacific water-jacket smelter, made by the Pacific Iron Works of this city, and indicates extraordinary furnace capacity, as well as good management.

With the stimulus of a well-sustained advancing market, many new enterprises of this character are now being inaugurated, as well as many old ones starting up, that under the stress of low prices had been compelled to suspend operations. The many uses to which copper is now applied will undoubtedly insure more remunerative prices to the producers than have prevailed during the past two years and put this great industry upon a more stable footing.

OAKLAND.—This, the second city on the Pacific Coast in size, is now following the example set by lesser places, and intends to let the world know more about it. A special edition of the *Oakland Enquirer*, published under the auspices of the Oakland Board of Trade, will shortly appear. We have been shown advance sheets. When people get this paper the illustrations will give a correct idea of all they see, nothing being exaggerated. The views are made direct from photographs, by the S. F. Photograving Co., of which A. T. Dewey, a resident of Oakland, is manager. There are several dozen engravings which give natural and truthful views, greatly in contrast with the generality of such publications. The paper is fine and heavy and printing well done. Altogether this edition will be creditable in every way, and will soon be completed ready for distribution.

GENERAL WM. B. HAZEN, the Chief Signal Officer of the U. S. Army, is dead.

MECHANICAL PROGRESS.

American vs. English Chains.

Complaints are often made of American-made trace chains, that they break under strains that an English-made chain would safely bear. The *Scientific American*, in allusion to such complaints some time since, said:

The best logging and trace chains are made by hand, each link being formed and welded on the horn of the anvil. They have been made so here for generations, and as the method is the same in foreign countries, and as good iron can be obtained here as there, no sufficient reason exists why American chains are or cannot be as good as others.

A hand-welded chain of tough iron is no better for having come across the ocean. It is possible there is an inferior article of home make which this correspondent purchased; there is little actual value in cheap jewelry. Small, unwelded chains are made by machinery, and some heavy log chains and farm trace chains are called "machine made," the links being bent by machines and the welds being made by belt drops. But these machine-made chains are of less market value than the hand-made chains, being rated at half a cent a pound less than those made by hand.

Some of the largest dealers in logging and farm chains in the Eastern country state that they have few complaints of breakages of American-made chains; they have far more from those of foreign make. The principal fault found with the home-made chain is in the attempt to weld by machine drop instead of by hand, the machine weld showing a good surface from the die but not being reliable. These chains are those which are hand welded. These chains seldom go to the market hurried over with coal tar; but frequently have been "tumbled" and polished so as to show their make. Sometimes too much work is exacted from a chain; when iron is bent and welded, it is not responsible for more tensile strength than one-fourth of that of the rod when tested in a straight line. The fact is, American-made chains are fully equal to those imported; and in many other productions of the hardy metals the American manufacturers lead the foreign producers. In this connection we would give the following description of the new mode of

Casting Chains in Solid Steel.

The description is from a paper read at a recent meeting of the British Iron and Steel Institute by M. Gautier, of France. The process described is that practiced by Messrs. Imbert & Ledger.

In carrying out this process a link which has previously been cast in a vertical position through an iron casting block, which is in two pieces, one of them lying upon the other in a horizontal position. At the end of this block there is a casting hole, used as a head to feed the casting. This part of the mold may be made in sand, in order to keep the steel liquid for a longer period than it would be if cast in iron, should such a course be rendered necessary by the special character of the steel employed. The instantaneous removal from the mold is done through three blocks or taps, which are connected with a shaft having an oscillating movement, depending upon a hand beam. Two of these blocks are so arranged as to act on the two ends of the upper part of the mold, which they can thereby raise, whereas the third block, being connected with the lower part of the mold, can let it down. Thus, by the simple movement of a hand lever the mold may be opened, and the casting is thereby directly liberated so as to cool and shrink. The same result could, of course, be obtained by the use of hydraulic power acting on three cylinders, so arranged as to operate together in two opposite directions.

The finishing of the chain is quite a simple process. Several casting blocks are placed on a revolving turntable, or it may be on a truck rolling on wheels. It is possible to cast several pieces of chain together, each cast adding a link. After the opening of the mold a workman cuts the head off the link, and afterward files the out, if that should be necessary. The links are subsequently placed in a vertical position, and the casting is continued as before. The chain having been completed in this way, it is annealed and hardened in oil, if necessary, after which it is ready to be tested. It appears superfluous to describe the advantages of a process at once so simple and so quickly performed as that which I have just referred to. The process is one that opens up a new field for the successful employment of the highest qualities of steel—such steel as can be trusted to remain solid and without blowholes when cast in chilled molds. Crucible steel generally would be suited to this purpose, and probably also the *mitis* metal, the high manganese steel, and chrome steel. If by this process better chains can be manufactured with a diminished weight of metal, it would manifestly be an important departure, especially for naval purposes.

Puddled Iron Still in Demand.—Notwithstanding the very general use of the modern converters, the puddling furnace is still in use, and its product in demand for many purposes. An Eastern exchange says: We have learned that one prominent concern in Pittsburgh, which has used a large amount of steel, has decided that for some of its products it must return to the use of puddled iron, and they propose erect-

ing in the near future an additional number of puddling furnaces. This by no means indicates that there has been any material check in this movement to substitute steel for iron. It simply indicates what was evident from the first, that experiment was necessary, and an experiment extending over some space of time, to indicate the uses for which steel was especially adapted and the purposes for which it would be wise to continue to use iron. We understand that the railroad companies are not entirely pleased with the success that has been attained in using steel for axles, and a similar statement is true to some extent regarding structural shapes.

Causes of Broken Rails.

A correspondent of a railroad journal in alluding to the frequent occurrence of the breaking of rails says: If railroads were more particular to buy good steel the number of broken rails could be diminished at least one-half. The breaking quality of it could be easily determined by having a few rails of every lot received sent into some yard to be used in switches and on sharp curves. There is nothing that will test the breaking quality like cutting it and snarving it with a big sledge or "Jim Crow." Good steel cuts well and can be curved with a sledge without breaking. Poor steel cuts hard and breaks when the sledge is used in trying to curve it. The sledge should not be used on a rail that is to be put in main track, as the blows weaken the rail; but in a yard, where no bad results come from a broken rail, the sledge is the best and quickest. Another cause of rails breaking is flat wheels under loaded cars. A flat wheel strikes a tremendous blow, one that shakes even the road-bed under the train. It is a traveling sledge-hammer and should not be run in cold weather when frost is in the rails and the road-bed frozen.

Another cause is trying to make a steel rail do service in main track after it is worn out. A steel rail that has given good satisfaction and done service for years under heavy traffic should be taken out when it commences to break at the bolt holes and to furnish an unusual number of broken rails. The rail may have worn smoothly and look good, but the fiber of the rail is gone. It then commences to break at the end where it gets the most jarring. Previous to this stage the splice bar does the breaking at this point.

Another cause for breakage of rails is in using steel rail that is too light under heavy motive power. The higher and heavier a steel rail, the less the breaking.

BLADES OF POCKET-KNIVES.—The blades of very cheap pocket-knives are punched in dies from sheet-steel, but those for first-class pocket cutlery are hand forged, a good workman being able to form 25 to 30 large blades per hour, and about 40 pen blades per hour. There is a pattern and gauge furnished the forger for each sort of blade, but the experienced workman rarely refers to either, his accuracy of eye and skill of hand being sufficient guides to exactness. The blades come from the hand of the smith perfect in form, except the bevel of the back intended to guide engaging blades, this bevel being formed by grinding. The steel used in these fine blades is Wardlaw's (English) or the best American make. As they come from the forges the blades are "choiled" or filled, to make a nick between the blade and the tang, then the blades are tempered, having received the trademark stamp on the tang under a press. The hardening is done in an ordinary coke fire, the operator heating two at a time and plunging them in cold water. The drawing to temper is also done over a coke fire. If the blades are sprung in hardening they are straightened, after tempering, by repeated strokes of a hammer having a thin face like the pene end of the machinist's square hammer, the blows being given on the cave side of the blade, as in the peening of cast iron, and with the same effect, that of stretching the hammered face. The blades are ground on Sheffield and Nova Scotia stones, "glazed" on emery wheels, honed or "set," and finally are polished on wheels of walrus hide fed with rotten-stone.—*Manufacturers' Gazette.*

FIRE FROM STEAM PIPES.—This lurking danger from fire, already quite generally of late alluded to, has been especially brought to the attention of the people of this city by the Fire Underwriters' Inspection Bureau. Attention is called to the danger of fire resulting from steam pipes in contact with wood, and the co-operation of property-owners, architects, builders, and others having such work in charge, is invoked for the purpose of securing a compliance with the order of the supervisors, which provides that "No steam pipes shall be placed closer to wood than three inches, and if such space is objectionable, it shall be protected by a soapstone or earthen ring or tube." The underwriters say, while steam pipes do not directly set fire to wood, that they will reduce wood to charcoal as proved by the finding of several hundred instances in this city, and experiments show that fire results from slow chemical reaction after wood has become charred under conditions liable to be present in any case where steam pipes are in contact with wood. A number of experiments are referred to, showing conclusively that fire results from this chemical reaction, even where the heat to which the wood became charred was subjected was not sufficient to boil water or explode gunpowder.

SCIENTIFIC PROGRESS.

Rings as an Index of Tree Age.

The annual growth or layer is, generally speaking, an index of age in a tree; but this rule has many exceptions, the reason for which is given as follows:

If we place a small section of wood under the microscope, we see cavities with closed walls—cells—everywhere, however they may differ in shape, manner and forms. These, of course, are the units of vegetation and vegetable growth, hence are elements of which every part of the tree consists, and it is this growth and multiplication which makes the growth of the tree; and from the time the embryo sprouts to this last day of its life this continues. The bladder-like cells of which the very embryo consists, multiply in number by the repeated division of each cell into two; when, in all cases, made and provided, the influences which nature provides for this process remain potent and unimpaired. If, on the contrary, these influences are withheld, or from any cause whatever are made impotent, the cell cannot be made to divide itself; hence the formative factor of the tree is maintained and extended, as intended. A tree may keep alive and not grow; all have seen this phenomenon, and many wondered at it.

A maple tree standing near the house of the writer, planted from the seed, was thrifty and vigorous for five years, then became stunted and puny, and in three years afterward was a scrawny, ill-shaped specimen. When it was cut down to make room for the widened street, a section taken from the largest part near the root was placed beneath the microscope, which showed that the tree had four well-defined rings, indicating a healthy, vigorous growth, after which the rings were not clearly defined, but seem to have been composed of a variety of rather number of rings, and such were very plain, giving the precise age of the tree, but if counted in a large tree would easily lead astray.

Digging down to ascertain, if possible, a cause, it was found that each root, rootlet and minutest tendril had stopped short in its growth, and ended in a round, blunt end, indicating that it would have possibly lived a few years longer, these roots and tendrils absorbing barely sufficient to maintain the fabric but not extend it. This establishes the fact conclusively of a non-separation of cells and failure to mark a ring each year. The above is from a correspondent of the *Midland Industrial Gazette*.

Another writer, Mr. R. W. Furras, an agent of the United States Forestry Department, who has given much attention to the age of trees, as indicated by rings, as well as to the period at which trees of different species stop growing and that at which the wood is at its heat, has reached some conclusions of general interest. He says: "Concentric or annual rings, which were once accepted as good, legal evidence, fail except where climate, soil, temperature, humidity and all other surroundings are regular and well balanced. Otherwise they are mere guesswork. The only regions within my knowledge where either rings or measurements were reliable indications are in the secluded, even, and regularly tempered valleys of the Southern Pacific Coast."

Annual measurements of white elm, catalpa, soft maple, sycamore, pig hickory, cottonwood, chestnut, box elder, honey locust, coffee tree, burr and white oak, black walnut, ogee orange, white pine, red cedar, mulberry and yellow willow—19 species—made in South-eastern Nebraska for 25 years, show that "annual growth is very irregular, sometimes scarcely perceptible and again quite large," and this he attributes to the difference in seasons. As trees increase in age, inner rings increase in size, sometimes almost disappearing. Diminished rate of growth after a certain age is the rule. Of four great beeches mentioned by London, there were three, each about 17 feet in girth, whose ages were respectively 60, 102 and 200 years. Mr. Furras found 12 rings in a black locust 6 years old; 21 rings in a shellbark hickory of 12 years, 10 rings in a pig hickory of 6 years, 11 rings in a wild crabapple of 5 years, and only 20 rings in a chestnut oak of 24 years. An American chestnut, only 4 years old, had 9 rings, while a peach of 8 years had only 5 rings.

Dr. A. L. Childs, a resident of Nebraska from 1854 to 1882—27 years—a careful observer for the Smithsonian Institute, who counted the rings on some soft maples 11 years and 2 months old, found on one side of the heart of one of them 40 rings, and not less than 35 anywhere, which were quite distinct when the wood was green, but after it had seasoned only 24 rings could be distinguished. Another expert, Thomas Meehan, editor of the *Gardener's Monthly*, says that all our Northern hardwoods make many rings a year, sometimes as many as 12, but as the last set of cells in a year's growth are very small and the first very large, the annual growth can always be determined except when, from local causes, there is in particular years little or no cell growth. This may give a larger number on one side.

Upon the Pacific Coast of North America, trees do not reach the point where they stop growing nearly as early as those of the Atlantic Coast. About 200 years is the greatest age attained on the eastern side of the continent by trees that retain their vigor, while 500 years is not uncommon in the case of several species of the western coast, and Mr. Meehan is confi-

dent that a *sequoia* which was measured was not less than 2376 years old. At Wrangell, lat. 36° 60', a western hemlock (*abies mertensiana*), six feet in diameter at the stump, was four feet in diameter 132 feet further up the trunk, and its rings showed 432 years. But in the Old Bartram Garden, near Philadelphia, not more than 150 years old, almost all the trees are on the down grade. The *quercus robur*, England's pride, which at home is said to live 1000 years, has grown to full size and died in this garden, and the foreign spruces are following suit. Silver firs planted in 1800 are decaying.

This great difference in the longevity of trees upon the western and eastern coasts of continents in the Northern Hemisphere seems to be due to the warm moist air carried by strong and permanent ocean currents, from the tropics northeasterly, in both the Atlantic and Pacific oceans, which makes the climates both moist and equable even in high latitudes. In Sitka, lat. 57°, as much as 100 inches of rain has fallen in a year, and the harbor is rarely frozen enough to hinder the passage of boats. In some winters, scarcely any ice is seen.

EFFECT OF THE GREAT EARTHQUAKE ON THE CHARLESTON RAILROAD.—Our readers will recollect the derailment of a train of cars on the Charleston railroad during the night of the occurrence of the great earthquake in that region. It was observed the next morning that the rails were bent out of a true line, and that the ties were in some places forced to one side of the track. It was thought and so stated that this bending of the rails in reverse curves was due to the violent oscillation of the ground to the east and west by the earthquake waves. A late correspondent of the *Scientific American*, however, has evidently given the true cause of the bending. He writes: "The true cause, as I believe, is the contraction of the earth crust in settling, to suit inner shrinkage, by reason of radiation and consequent cooling, thus shortening distances and bringing such end thrust on the rails that they are compelled to bend. If lateral oscillations were to bend the rails, they would also bend the roadbed and the sides of the ditches, which, I understand, was not the case. The sliding of the cross-ties to one side of the roadbed shows that the rails moved the ties, and that the cross-ties did not move the rails. Everything goes to show that the end thrust on the rails produced the bends. All agree that the earth does contract, and end thrust is, therefore, a natural consequence." The correspondent further suggests that the space always left between the ends of the rails to allow for expansion in the hot weather of summer may have been so reduced as to lead to other casualties during this coming summer's heat—a timely hint, which should not be suffered to pass unheeded. It has also been noticed that a violent magnetic disturbance followed the earthquake, which was noticed as far north as Rochester, N. Y., where a magnetic needle two feet in length moved over an arc of five degrees.

FORMATION OF FOG.—The experiments of Coulier and Mascart, extended by Aitkin, have demonstrated that in a perfectly moist air no formation of fog is possible, however much the temperature is lowered, so long as the air is absolutely free from dust, and that the more air, sufficient moist, is charged with such foreign particles, the more intense is the formation of fog under a sufficient lowering of the temperature or pressure of the air. Let filtered and completely moist air in a glass ball have its pressure diminished; then will only a few particles of fog reveal themselves to the most careful inspection, even under the powerful light of an electric lamp—particles of fog which, moreover, yield not the slightest colored image. Admit now into this filtered air a few cubic millimeters of ordinary house air, which always contains numerous motes or particles of dust; then will a very fine, silvery, transparent fog at once form itself, of such slight density that, even in the case of considerable area of it, the transparency of the atmosphere would be but very little affected. At the first moment of its formation let a reflected image of the sun, or the reflected light of an electric lamp, be viewed through it; the image will be seen surrounded by an intensely luminous blue or greenish light.

THE SUN ALL RIGHT.—The heat of the sun is not increasing. The researches of the botanist and geologist show that the solar radiation of heat cannot have varied but in a very trifling degree since the most remote geological ages—that is, for millions of years. It is estimated that the measure of the heat of the sun at its surface is 18,000° F., which is five times the highest temperature man can produce artificially—equal, in fact, to what would result from burning a mass of coal (of the best quality) 200 miles broad, 200 miles long and 200 miles high—that is, 8,000,000 cubic miles of coal. This would be about 12,000,000 of millions of tons per second. It will help us to imagine what this means if we consider that the whole output of our exceptionally coal-producing country is but about 150,000,000 of tons per annum. It is calculated that only one 2,331,000,000 part of the sun's heat reaches us, and therefore the whole amount really passes either comprehension or calculation, and it is a vexed question with astronomers as to what becomes of the heat that goes off into space.

ENGINEERING NOTES.

Engineering Advance.

No class of men better than the engineers recognize the fact that all they have done, step by step in the past, has been but "stepping-stones of their dead selves to higher things." What-aver they have designed, projected or builded has been but new platforms upon which to successively mount to finer results, nobler efforts and grander designs.

Of all other pursuits, that of the engineer is the advance of improvement in all which pertains to systematic, perfect work, to beauty of combination, and practical usefulness.

In this we may include the civil engineer, the architect and landscape gardener, as well as the mechanical, the hydraulic and the mining; and there should be a new term to designate a wide departure from all these in mere practice, the designer of grand achievements in bridge, tunnel, grade, curve, or other stupendous work like the ship canal and railways, the immense bridge structures and the mountain railways and hydraulic operations.

The inventor, the worker in metals, in fine material and for fine purposes, is also a designer and an engineer, to whom we owe very much of the grand advance in all industrial, mechanical engineering, and art work of the past few years. America has very little of military engineering. She has a great deal of vigorous, practical application of material to emergencies, but the fine arts of military affairs, fortifications, ships, armament, etc., are still wanting, largely, because circumstances and government regard have not called out to development this wealth of resource and material waiting.

In fact in the fine art of engineering achievement in all directions, we have rather the practical, substantial, useful results, instead of the superlatively fine finish of artistic design which seem to be suggested.

From all the exhibitions in practical industries in Europe and of our own Centennial, America is plainly immensely in advance of the other nations in practical working and in complete results; but there is much naturally suggested when a survey is made of the wide field so prolific in resources.

There is still a want of completeness, a feeling that when capital shall be led to demand it, our inventors, architects and engineers will astonish themselves in the facility with which they outdo all previous efforts in a finer, more perfect, more complete adaptability of design to practical results.

In architectural and structural design of adapting structure to character and purpose, as well as in the clear, fine boldness which gives character to the builder and the object, there seems great room for the invention of the true engineering mind.

In the steam engine in its later habiliments, and in the dynamos and motors, there is suggestion for an immense step in advance in locomotive engineering. The railway has been curbed and restricted by the fear of unappreciated legal enactments and want of dividends, but now that surpluses of \$25,000,000, \$50,000,000 and \$100,000,000 of assets and reserves are at hand to back the engineering skill, there should be a grand advance in the character of our permanent ways, by which the credit and worth of the nation's character are to be judged.

There is the need of the railway, the demand for and the guarantee of its permanence, and there should be the pride, confidence and purpose to make it one of the nation's crowning glories. In sanitary engineering a complete system is yet to be prepared.

Finer effects, more perfect, more complete results are suggested all along the line of inventive and engineering endeavor, and Goethe said long ago that "the desires are but presentiments of dormant powers."—*Chicago Jour.*

TO CONVEY NATURAL GAS LONG DISTANCES.—It has been found a very difficult matter to convey natural gas long distances through pipes. The methods heretofore have been on the principle of forcing the movement by the aid of force-pumps; but it has been found that, as is the case with some animals, there seems to be some inherent principle which renders forcing an extremely difficult matter, and for very long distances absolutely ineffective. In view of this, Col. Roberts, of Pittsburgh, Pa., after some experimenting in this direction, has resorted to the expedient of *coating*. He proposes, instead of forcing the gas, to draw it at low pressure through large conduits by means of exhaust fans at distances varying from 10 to 40 miles, according to the character of the ground to be traversed. These fans, which would be hoxed in the conduit, would be about 16 feet in diameter, and would be driven by engines of about 20-horse power. They would only revolve at the rate of from 30 to 50 times a minute. The patent provides for an alternative method. This is to lay a second pipe under the other one when ascending a hill. This pipe is to be perforated with burners, the heat from which will rarify the gas. At the top of the hill a tank of water will be placed, from which a pipe would be laid over the gas pipe on the descent of the hill. This pipe also will be perforated to discharge a spray over the gas pipe, thus causing a condensation of the gas. This system will cause the main to act as a siphon, and will maintain an even flow over the bill.

USEFUL INFORMATION.

Utility of Mineral Wool.

The use of this peculiar product is rapidly increasing. The special reason of its value for certain purposes—the philosophy of its action in conveying or retarding heat is given as follows: Mineral wool is an excellent non-conductor of heat because it contains a great quantity of air. Air is so subtle and rapid in movement when unconfined, and so slow to convey heat, except by its own motion, that it is at once the very best distributor of heat, and also the greatest barrier to its transmission, according as it has, or has not, freedom to circulate. It is not a matter of surprise that this apparently anomalous state of things is misleading and constantly giving rise to popular errors. That the dimensions of what is called an air-space are entirely arbitrary, no one will deny. It may have a volume of one cubic foot, or it may be the smallest unit of volume into which air is divisible. We are disposed to classify the first class under *climatology*, and the second under *insulation*, for so long as air may circulate at all, it is conveying heat from one place to another; while if it is held in position by any medium, the heat must be conducted—not conveyed. Now, if the air-confining material is not very loose and porous, it will be found to *transmit* heat, and furthermore, the reduction of the percentage of volume of air by making the material more compact, develops its capacity for *conducting* heat. Therefore, so far as theory goes, the poorest conductor of heat is the material which contains the largest percentage of volume of air, and any other view of it is at variance with science and nature.

We find that 192 pounds, or 1 cubic foot, of slag makes 192 pounds, or 11 cubic feet, of ordinary mineral wool, so that the resulting fibers encase 11 times the quantity of air that the slag did; in other words, the cubic foot before conversion contained 100 per cent of material, and after conversion only 9 per cent, therefore the product must contain 91 per cent of its volume of air. In the same way the extra grade is found to have 95 per cent of its volume of air in it, and consequently it is a better non-conductor than the ordinary. It is certain that this proportion of air is not encased by any other product, natural or artificial, which is at the same time indestructible.

The transmission of sound is prevented by a filling of mineral wool, because of its inelasticity or want of solidity. This is a very important feature, because no other material in general use for heat-proofing and fire-proofing possesses also the property of sound-proofing. A fourth advantage, which is of equal value with the others, is the irritation which the glass fibers cause both to insects and vermin. There is nothing in its composition which can help to breed or harbor insects, and no animal life will remain in it.

UNSHOD HORSES.—Mr. P. H. Fagin, a furniture and piano mover at Malden, Mass., gives his experience with barefooted horses. He has driven three horses (two weighing 1100 pounds each and one 1300 pounds) since January, 1885, without shoes. The large horse has always been lame since he bought him 14 years ago, until he took his shoes off. The animal has not gone lame since. He has driven on hard, flint roads, and, of course, on pavements in Boston. The horses travel better than before their shoes were taken off. They are not afraid on slippery pavement as they were with shoes on, and there is no trouble in getting round on any kind of going in the city. Mr. Fagin drove to Shrewsbury, 35 miles from Malden, after two days' rain, in February, 1885, when it was so icy that a boy could skate all the way, and had no trouble. He left home at 7 A. M., arrived at Shrewsbury at 3:40 P. M., and the horses did not slip. The hoof is hard and broad, and the frog is full and plump and on a level. They have driven two winters on ice and snow altogether better than when they were shod. Their feet are better for all purposes, they can trot faster, pull as much and go more miles in the same time than they could when shod.—*Boston Herald.*

A SURE METHOD OF CUTTING GLASS TUBES.—Ernest Beckmann states that glass tubes of any thickness and diameter, as well as funnels, bell-jars, etc., may be safely cut by making a file mark and then building up rings of wet filter paper, 1-2 mm. high, and 2-4 mm. wide on each side of the mark, at a distance of 1-2 mm. The intervening space is then heated in a Bunsen burner flame, or better, by the pointed flame of a blast lamp, while the tube is rotated on its axis. The tube then separates at once in the line between the walls of filter paper. The paper must be saturated with water, must be easily laid on, so that it builds up straight walls, and the thickness to which it is wrapped will depend upon the diameter and thickness of the tube.

STOPPING RUNAWAY HORSES.—The following method of stopping runaway horses would seem to be good, but few horse-owners would care to advertise the vicious character of their animals by such a conspicuous device; neither would the owner of a horse ordinarily safe wish to adopt such a cumbersome contrivance as a regular part of his harness: "Place a cord with a running knot around the horse's neck near the

neck strap. To this slip-noose attach a pair of reins which may be thrown over the dash-board ready to be seized at once. When the horse starts, take up this cord and tighten the horse's throat. The most furious horse thus choked stops instantly and will not fall or kick. This is a Russian discovery."

A NEW RAILROAD BRAKE.—A new railroad brake, called an anchor brake, has been proposed by the *Railroad Gazette*, to be used in cases of emergency. The proposition is to have an anchor to drop from the rear end of train and engage with the ties. Provision for preventing the bending of the ties "under the strain brought upon them" might probably be devised as simply as for the axles; and by having a good long spring to ease the shock when the anchor came to a bearing, in addition to the relief which would come from the draw-springs of the entire train without any expense at all, a train might easily be brought to a stop within 15 or 20 feet from an ordinary passenger speed, if something did not give way.

ABOUT PUTTY.—The best is made of linseed oil and whiting, the latter being simply chalk, ground fine. It comes from the mill with a fine, flinty grit. The adulteration of putty consists generally in mixing soft marble dust with the ground chalk. A superior article of putty for filling cracks, as in carriage and wagon bodies, is made by adding white lead in oil, Japan varnish and a small quantity of turpentine, which makes a hard cement that will not shrink, and which, when dry, can be battered down like pumice-stone or dusted like sand-paper, so smoothly will it cut. Even in the common sorts of putty, it is well to use white lead if a hard putty is wanted.

WEIGHT OF BOILER IRON.—A cubic foot of wrought iron weighs 480 pounds, consequently a piece one foot square and one inch thick weighs one-twelfth of 480 pounds, or 40 pounds, and a plate one foot square and one-sixteenth of an inch thick weighs 2½ pounds. Now, from this, the rule to find the weight per square foot of boiler or sheet iron is to multiply the thickness in sixteenths of an inch by 2½, the result being the weight in pounds per square foot. Example: The iron in a boiler is five-sixteenths inch thick. What is the weight per square foot? $5 \times 2\frac{1}{2} = 12\frac{1}{2}$ pounds, the weight required.

GOOD HEALTH.

How to Resist Cold Weather.

A physician gives the following sensible directions for avoiding colds. Now that the winter is upon us, they will be worth bearing in mind: "To be able to stand cold, one must eat such kinds of food as will give plenty of heat, and must also accustom the system as much as possible to cold. Heat-forming foods are rice, sago, tapioca, potatoes, the grains of wheat, oats, barley, and especially maize. I do not recommend fat, because it is difficult of digestion, but in moderation it is useful. Oatmeal porridge eaten with butter and sugar forms a good cold-resisting breakfast. Then rice, with peas, barley and a little oil or fat, makes a good dinner; while for tea some brown bread, with butter and preserves, will not do. To accustom the body to cold, one must not wrap up too much, but make the body adapt itself as much as possible to the cold. The human system possesses in the brain a center for the government of the heat of the body, by which it is always kept at one uniform height. If we heat our bodies by hot drinks, heaps of clothes, hot rooms, etc., we give this center little to do. But if we expose the body to cold air, take our food nearly cold, and do not clothe too heavily, we keep this in good condition, and it will keep the body warm if we give it the necessary food, and is ready for sudden exposures. The body can be used to cold by means of air baths, or exposing the nude body to the air. This can be done by taking exercise at the same time, and so no cold will be felt. In connection with heaps of clothes, I may say that I have cured two or three weak chests by making the persons throw aside the chest protectors (which are a snare) and sponge the chest daily. When cold do not rush to the fire, but take a sharp run, stamp the feet, and throw the arms across the chest, making the fingers hit the back, like catmen do. Avoid hot fluids, of tea and soups, which give a fleeting feeling of warmth. They are very good if you want to restore a numb person. But if you are not much in the open air, take your food nearly cold, and the system will then supply the required heat, and you will find you can stand the cold much better than if you took hot drinks."—*Ex.*

CONSUMPTION FROM COWS' MILK.—Dr. Hopkins, of this city, a microscopic specialist, by appointment of the Board of Health, claims to have found in the milk of consumptive cows the germs of the disease. He says that the bacillus is long and tube like, and made up of infinitesimal spores, only visible under the most powerful microscope. By his experiments the doctor believes he has shown that, in the case of a cow suffering from consumption, the germs of the disease are to be found in the milk. He believes that the injury done by these germs when taken into the human body depends on the health and delicacy of the organs of the person who drinks the milk. This discovery

having been reported at the late meeting of the San Francisco Microscopical Society, that body appointed a committee consisting of Drs. J. H. Stullard, H. Ferris and the president, Dr. S. M. Mouser, to visit Dr. Hopkins and examine the slides which he has prepared exhibiting these bacilli. The discovery opens a new and important field for investigation, and presents the question whether consumption may not be contracted from the use in diet of milk from cows suffering from pulmonary complaints. The committee will report the result of their visit and inspection at the next meeting of the society.

Advice About a Very Bad but Common Practice.

"Few habits are more prevalent, and none more disgusting, than biting the finger-nails," said a prominent physician the other day. "Cleansing the nails with a penknife and picking the teeth in public are practices vulgar enough, but biting the nails is far worse. It is disgusting in more ways than one. It renders the finger-tips soft, pulpy and shapeless, and destroys the beauty of the nails. Properly cared for, they are an important item in personal adornment. Next to pearly, regular teeth, pink, shapely nails are, perhaps, the most striking indication of neatness and cleanliness. A person with no regard for these little things is pretty sure to be slovenly in other respects; one who munches at his finger-nails as he talks to you may be set down at once, and with slight danger of injustice, as an all-round slattern. Besides, think of the nastiness of it. Dust and dirt of all kinds lodge under the finger-nails. Every article the hand touches contributes its share to the rapidly accumulating deposit of filth. There is no shoe mending matters. The nail deposits are filth of the most offensive and miscellaneous sort. The dirt lodged under the nail soon becomes soft and pasty from the excretion of perspiration. In this form it is bitten off with fragments of the nail, moistened by the saliva, turned over in the mouth, and not infrequently swallowed.

"Did you ever observe a doctor at his ablutions? Invariably he washes his hands first. Then he carefully wipes them and empties and rinses out the bowl before he washes his face. He knows that the bands attract dirt, just as a sponge absorbs moisture, and he has too much respect for his face to bathe it in the same water that has cleansed them. His professional experience has taught him also that poison in the shape of virus from wounds and contagious diseases is often contributed by so simple a process as hand-shaking. He doesn't propose to have his eyes or nose or lips contaminated by his hands in that way. The person who bites his nails is infinitely more liable to that risk, for he takes the concentrated filth from under the nails into his mouth.

"But, worst of all, the nail-biter is a self-devouring cannibal. I wonder how many sentimental school-girls, who keep their fingers in their mouths half the time, and dukes, who nip at their nails as industriously as they suck their cane heads, have ever thought of that. Probably not many of either class. But it is the fact, all the same. When the nails are bitten off, chewed up and revolved in the mouth, as though they were succulent tidbits, it necessarily happens that small particles of the quick are also removed. These particles are human flesh—the nail-biter's own flesh—and they are masticated, frequently swallowed, with the other revolting morsels. Any one who can bite his nails, after that thought, will never suffer from nausea."

A STRANGE OPERATION.—The *Philadelphia Press* gives the following account of the restoration of speech by removing a clot of blood from the brain: Young Gustave Rinsold, who was recently shot in the head, on Nineteenth street, by a comrade, was made the subject of a brilliant operation by Dr. John B. Deaver, demonstrator of anatomy at the University of Pennsylvania, in the presence of his class of students. Rinsold's wound was not looked upon as serious at first. He walked to the hospital, being conscious, and suffering from no paralysis. Yesterday morning his speech was slightly embarrassed. Dr. Deaver was summoned, and pronounced the case to be hemorrhage of that part of the brain which presides over the sense of speech—a clot of blood compressing it. The professor performed the operation by trepanning the wall of the skull and removing the clot of blood, after which the patient could talk as well as before the accident happened. It was considered a wonderful operation.

CURE FOR A FELON.—An exchange gives the following: That woolen smoke is a cure for a felon, is certainly one of the medical discoveries of the age. Could we give the name of the correspondent who sends us the following, it would be at once recognized as of authority sufficient to guarantee the truthfulness of any assertion to which it might be appended: "If you ever endured the agony of a felon, you will appreciate the fact that it can be cured by woolen smoke. Place the woolen rags under an inverted flower-pot, and put coals upon them, or set them on fire in some other way; then hold the felon over the smoke and it will extract all the pain. This has been done by a friend of mine within a week. I assure you that in my circle we consider it as great a discovery as that ether will temporarily deaden pain."

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ORIGINAL AMADOR.—*Ledger*, Jan. 15: This old mine of Amador City, which has been abandoned by the formerly English owners for five or six years, has lately fallen into the hands of O. C. Hewitt and T. L. Culbert, who have recently started work upon it. Toward the top of the hill they have struck a ledge of very good quartz, which it is claimed will yield \$8 to \$10 per ton. The ore body is said to be four feet wide. They intend to put up a five-stamp mill at once. W. A. Nevills left Wednesday afternoon to proceed to San Francisco, and from there to New York, en route for England. His business is to dispose of the Moore and other mines in this section to a powerful English syndicate. The Amador Queen M. Co. have offered to compromise the claims of the lien-holders for 25 cents on the dollar. The creditors generally refuse the offer. It is reported that a list of all the mines along the mother lode has recently been forwarded to capitalists in England, who are thinking of investing here. The Downs mine at Volcano has been abandoned, it is believed finally, so far as the present company is concerned. They encountered plenty of quartz, but of too low a grade to pay. The pumping machinery has been taken out.

SUTTER CREEK.—John Tregloan arrived last Thursday night, and at once set to work calculating what was best to be done in starting the Wildman mine. Knight & Co. have secured the contract to put up hoisting works forthwith, also to put in one of their patent hydraulic pumps. Teams are on the road hauling timbers for the hoisting works, and everything will be pushed ahead to get in supplies before the heavy storms set in, if possible. Twenty stamps of the Lincoln mill are running steadily, and will probably be kept going another month. The Mahoney managers give every assurance that the water will be taken out in the spring, and the mine started in full blast.

Calaveras.

SPECIMENS.—*Mountain Echo*, Jan. 15: We were shown some exceedingly rich specimens of quartz the other day. There were three or four pounds of them, and we think they contained at least \$150. Our informant said he had nearly a candle-box full of the same kind of specimens, and several hundred dollars of free gold taken out at the same time. The mine is situated a short distance from this town.

GASTON HILL.—*Calaveras Prospect*, Jan. 14: At the Gaston Hill mine, located between El Dorado and Cave City, three men have been employed, who have sunk a shaft 100 feet. At 70 feet from surface they drifted 75 feet on lead with good results, finding several pockets with very rich ore. Have crushed 75 tons of ore at Rose Hill mine. Have discontinued work on mine until a cleanup is made at the mill.

Contra Costa.

GOLD ON MOUNT DIABLO.—*Martinez Item*, Jan. 18: D. S. Carpenter informs us that parties who have been prospecting on the side of Mount Diablo for the past three months have discovered a well-defined lead of argentiferous quartz, in paying quantities. He accompanied two other gentlemen to the spot a day or two since and collected some specimens that are really fine and assay \$500 to the ton.

El Dorado.

GEORGETOWN.—*Cor. El Dorado Republican*, Jan. 16: The Alpine mine near this place closed down this week. The supposition is that some freeze-out game is being played, as the mine has been prospecting well for several months. The miners in this vicinity held a meeting in Georgetown to-day for the purpose of defeating the C. P. R. Co., who are trying to get a patent for mineral lands in this vicinity. The miners seem confident of success in the coming contest. The several quartz mines in the vicinity of Garden Valley are running full blast. H. A. Wagner and Gilbert Cook, of Bear creek, have struck a fine prospect in quartz near the Bear creek schoolhouse. The ledge is about three feet wide and prospects well in free gold, besides a fine prospect in all the quartz. The Slate Mountain mine is booming along at the usual rate, and it is said that they are getting out some very fine rock from the lower level.

Fresno.

HILDRETH.—*Cor. Fresno Republican*, Jan. 12: "Off to the mines!" is the cry in San Francisco and cities in Fresno county by "suckers" and others in general, who hear of the gold production monthly, thinking that they will stumble over a gold-bearing ledge that will be exposed to the naked eye. But don't come with such expectations as some have, and, above all, don't come broke. Mining men are arriving in numbers, and private conversations are being held with hardy prospectors at every corner of the town, while some very important mining properties are changing hands, and everything in the shape of a gold-bearing ledge is being bargained for at favorable prices. One-half of the James & Francis mine has been sold to some San Francisco mining men for \$30,000, with the agreement that the new owners erect a plant immediately and sink 300 feet, drifting at each 100-foot level. Machinery has already been shipped from San Francisco. This is the mine of the district, the amount of rich ore being enormous. The shaft is down 125 feet, and a crosscut of 40 feet is in high-grade ore. The McNally mine is developing wonderfully. On the 600-foot level there is a four-foot ledge that goes \$50 to the ton of good-mining quartz. The company is sinking to the 1000-foot level, and will run levels at each 100 feet. The company made a big bullion shipment on yesterday's stage which heats all previous ones. The Mountain View mine is about to be sold for \$100,000 to an English company of San Francisco. A number of parties have been trying to get possession of this property, but Pete Donahoo knows when he has a good thing. McNally reports the White Rock mine as looking fine, and the indications are that it will continue so. Twenty-three new ledges were recorded last week in the Hildreth mining records, and still they keep coming in. The Hanover prospectors are jubilant over the size of ore bodies discovered of late. The hills are covered with prospectors, and, judging from the

change of ownership in various claims, quite a boom will be at hand in 30 days. Experts are common, as well as the mine-hunter, and from the work that is being done at all points of the compass upon prospects, the hullion production will surprise the natives next month. Wm. Dunphy will begin sinking upon the Hildreth mine in a few days—as soon as the new pump arrives—with Mr. Wallace as manager.

Mariposa.

BUENA VISTA.—*Gazette*, Jan. 15: Outside of the Buena Vista mine, which has been leased or bonded from Dr. Turner by San Pedro, we have heard of no new developments. We learn that the force of men employed about the mine has been increased, and, to all appearances, things upon the surface about the hoisting works and mill are moving systematically along with a view to having a permanent business. It is greatly to be hoped that Mr. Pedro will meet with success in this new enterprise of developing the Buena Vista mine, as it will not only be a boon to the owner of the mine, who has invested largely, but likewise to a neighborhood of miners and families who have been waiting, and are in a great measure dependent upon the success of this mine. We are informed that Mr. Pedro has been making some inquiry regarding the Cannon or Mexican mine, which is but a short distance from the Buena Vista, and belongs to Capt. Diltz. This has always been looked upon as a valuable mine. Prior owners have made a living from float rock and dirt about the croppings of this vein for years. There is an old shaft some 60 or 70 feet deep, which we are told shows a good vein the entire depth. If Mr. Pedro has any idea of examining this mine the sooner he does so the better, as Capt. Diltz is negotiating with parties for all of his mines. The situation of the Mexican mine is extremely favorable to the Buena Vista mill and mine, and in our opinion would materially strengthen and add great value to the whole property. Then, again, the chances are favorable to the Mexican being as valuable as any mine in that neighborhood. During the past week Capt. Diltz has visited the head of the Malone water ditch for the purpose of ascertaining the quantity of water at this season. He reports that there is plenty of water, if conveyed by pipe, to run 50 stamps successively arranged with an overshot wheel and five stamps at a battery, if constructed according to his plans, of which he has prepared a draft illustrating a most feasible plan for crushing quartz at a cost not exceeding one dollar per ton. The captain says that if water-power cannot be obtained, the crushing of quartz rock by any other process will never be made profitable. There are now visible at the Whitlock and Diltz mines hundreds of thousands of tons of quartz rock, which would yield a handsome profit to a water-power mill. If Capt. Diltz plans for crushing the quartz rock from these mines could be carried out, it would open up a lifetime mining enterprise, one that would be largely remunerative to its owners and increase annually in value. The line which has been surveyed with the view to laying down pipe is something less than 12 miles from its source to the head of Whitlock's creek. The water then can be utilized for a compressor of 50 stamps, besides as many five-stamp batteries as might be thought proper to construct.

Napa.

QUARTZ MILL.—*Independent Callistogian*, Jan. 12: Grishy & Johnson are making preparations to erect a quartz mill on their mining property, and in each of such preparations is the laying of inch-and-a-quarter pipe to supply the stamps. The water will be brought from the vicinity of the "Pallades," and the fall from the source of supply to the mill will be over a thousand feet. The pressure on the lower section when the pipe is closed will be over 400 pounds to the square inch. When necessary this power will be utilized in pumping and keeping the mine free from water, the supply from the pipe, after thus used, being conducted to the mill, where only the water, without the power, is required.

Nevada.

QUARTZ CLAIMS BOUGHT.—*Transcript*, Jan. 14: M. W. Connelly, of Santa Rosa, has purchased at administrator's sale for \$450 the Mt. Hope and Golden Gate quartz claims on a tributary of the south fork of Poorman's creek, Eureka township, which belonged to the estate of Patrick Mulligan, deceased. It was in a quarrel over a water right in the same neighborhood that Mulligan was killed last summer. Mr. Connelly proposes to develop the ledges. He used to be engaged in mining there a good many years ago.

SUITS.—*North San Juan Times*, Jan. 15: Two new suits have been brought against the Milton Mining Company for contempt. Neither of them can be made to stick, because the company was not playing the water against a bank of gravel through a nozzle. They were washing away bedrock which had been gathered and wheeled in a barrow to a point near the sluices. These suits are brought to harass the company, and for nothing else.

WASHINGTON ITEMS.—*Nevada Transcript*, Jan. 15: Last Tuesday a 14-foot ledge of the richest large body of ore ever found in that mine was struck in the 400-level of the Yuba. The quartz had been yielding well for some time, but this discovery is remarkable for its size and character. Superintendent Hare felt so well over the find that he stood the treat for everybody around the mine. There is on the Yuba a 25-stamp mill, but the water-wheel in use gives only sufficient power to run 15. In the spring a new wheel will be put in, so all the stamps can be used. B. J. Watson & Co. are erecting horse-power hoisting works at their quartz claim on Deadhorse Flat, at the head of Canyon creek. They propose to thoroughly prospect the ground, and if the present good indications hold out they will extend the Mayhew road to their property.

THE COE MINE.—*Foothill Tidings*, Jan. 18: This mine closed down a few weeks ago because of the fact that the shaft is of too small dimensions for expeditious working and the machinery not being of sufficient power to handle the water. Since the closing down, surveys have been made to ascertain the feasibility of obtaining sufficient water-power to run machinery that will answer all purposes, including that of a mill. One survey gave 217 feet fall of water, and still another gave 254 feet. It is quite likely that new machinery and a mill will be erected on this property at some future time. The stockholders have great faith in their mine, as the last ore taken out yielded \$20 a load, and the ledge is a large one. A previous crushing yielded \$14 a load,

and with a big ledge and a mine and mill run by water-power, even rock yielding less than \$14 is a pretty good thing.

San Bernardino.

NOTES.—*Calico Print*, Jan. 16: The leaching works and all the mills are running at full capacity. H. G. Tohler has a lease on the Mountain Brow and is taking out some good ore. Last Monday an injunction was served on the chlorides on the Jennie Lind, by Barber, Cook & Co., and work on the property was immediately discontinued. The Harwoods are still at work on Bonanza Hill, as Barber, Cook & Co. do not claim that portion of the hill as a part of the Jennie Lind, but Col. Harwood claims not only the ground he is working so profitably, but also the entire property called by Barber, Cook & Co. the Jennie Lind. John Anderson, a prominent and enterprising business man of San Bernardino, and the principal owner of the Pinto mine, arrived in town last Monday to look after his mining interests. The fine showing of his mine is quite gratifying to him, and he believes that the mine contains ore enough to keep a five-stamp mill running for years, which would yield a handsome profit. It is also his opinion that the establishment of large leaching works would open up a new and prosperous era for Calico. Mr. Anderson's mining interests in the Lava Beds are also increasing in value every year. Last Friday, Soule & Stacy went out to take a look at their mines, the Cleveland and the Midnight, near Fish Ponds, on which Andy Laswell, one of the owners, is now working. They were pleased with the appearance of the property and surprised at the immense body of ore in sight, which has been uncovered at intervals for a distance of 2000 feet. A tunnel has been run into the ledge, uncovering a body of ore 60 feet wide, and there is still ore in the face of the tunnel. The ore consists principally of lead, with a fair percentage of silver. It is a splendid proposition for a smelter. These lead mines and a number of others a short distance from Daggett, would keep a smelter in operation indefinitely. It will not be many months before a smelter will be put up at that station. Last Friday, Perkins, Clark & Settler sent out five men to sink a combination shaft on the Jim Blaine mine, in Five Points district. Last Tuesday, Marcus Pluth and J. Madison left Daggett for Five Points district with 7 men, to sink and drift on the Vienna and London lode. The De Soto mine in the Lava Beds, owned by Eckles, Jordan & Gray, is turning out some very rich ore. Messrs. Eckles and Jordan leave to-day to visit the property, which is under the management of Mr. Gray. Jesse Umbs was in town the other day and stated that the Coffman Bros. are taking out, at a depth of about 100 feet, some good gold rock from the Tip Top mine at Kramer on the Atlantic & Pacific railroad, half-way between Daggett and Mojave. Col. J. S. Loveland left San Francisco last Wednesday, with five men, for Holcomb Valley for the purpose of cleaning out the deep incline in J. B. Osborne's gold mine, in that district, preparatory to the visit of experts, whose report will probably complete the negotiation for the sale of the mine.

San Diego.

AN OLD MINE.—*Santa Ana Standard*, Jan. 16: For years there have been traditional accounts of an old mine in the range of mountains in San Diego county, bordering on the desert, and many prospectors have looked in vain for this mine supposed to be very rich in free gold quartz. In June last a party consisting of C. F. Stamps, Jr., Theo. Staley and T. A. Darling, while in the aforesaid country hunting and recreating found an old shaft about 30 feet deep, together with further evidence of considerable work having been done in that vicinity a great many years ago both in quartz and gulch mining. Samples of the rock were brought in proving to be richer than expected, some specimens assaying over \$400 in gold, and an average test of the rock on the ancient dump showed about \$30 per ton. The ore is free milling, and the ledge well and clearly defined and was traced for nearly a mile on the surface. The parties have taken steps to work the mines in conjunction with the Chilson Brothers, of Anaheim, who have visited the property and pronounced it a very encouraging prospect. Several capitalists of Los Angeles and Pasadena are also interesting themselves, and no doubt the development of these mines will pay to all interested good returns. Wood and water are near by and good roads for wagoning to a point where it would be necessary to locate a millsite. From all accounts we can gather in regard to the matter, this discovery of perhaps a mine that has been worked a hundred years ago by the old Spaniards who first came to California, is likely to create one of the liveliest mining camps on the coast.

Santa Cruz.

GOING FOR GOLD.—*Santa Cruz Courier-Item*, Jan. 16: Gold Gulch, near Felton, is the scene of quite a mining excitement at the present time. About a dozen men were busy last week in different places on the Gulch mining for gold, and we learn that they are making very good wages. During the fall months Mr. E. Foster has been doing some mining work near Gold Gulch. He has had a couple of men employed drifting into the hill, following an eight-inch seam of quartz that gives a good prospect in gold. The tunnel has reached a distance of 115 feet. There has been a gradual widening out of the vein as the work progressed. Mr. Foster informs us that work will be resumed early in the spring and the ledge followed up. In this connection we might say that a number of years ago, in this neighborhood, a detached quartz howler some 18 feet in diameter was found that yielded a large amount of gold. The hole from which the howler was taken is still to be seen and is about 25 feet in diameter and 20 feet deep. A tunnel 1300 feet in length was run into the hill at the time in the hopes of finding a ledge, but with no result.

Shasta.

BULLYCHOOP DISTRICT.—*Cor. Shasta Democrat*, Jan. 12: The Cumberland mill is running day and night on very good ore, crushing about 60 tons per week. Their new ten-stamp mill and hoiler is on the road up here. They expect to throw out the old machinery the last of this month and put in stamps. Superintendent Hart is getting out the timbers and excavating, so by the time the new machinery gets here he can put it in and have it running in about two weeks. He says he will be able then to crush 20 tons a day. A sawmill man was up here this week, selected and located a millsite, and says he will have a sawmill running by the first

of next February. The company has about 30 men employed driving three tunnels and sinking two shafts. The ore runs very even, from \$9 to \$12 a ton, and there is an unlimited amount of it. I candidly think that next summer we will have the liveliest camp there is in Northern California. Davis Bros. & Co. have bonded the Pound Cake mine for \$40,000 to an English company. They have been taking out high-grade ore lately; have tapped at a depth of 174 feet, and found the vein growing wider as it goes down.

IRON MOUNTAIN.—*Shasta Democrat*, Jan. 12: The Iron Mountain Reduction Works will be started up in a few days. Peter Scheerer has bonded his tellurium mine to Mr. A. F. Blood, of Chico, who, it is reported, has interested ex-Governor Geo. C. Perkins with him. Development work on the mine will commence in a few days. The Calumet Mining Company is crushing 20 tons of ore a day. After a 10 days' run, last Saturday, they cleaned up \$1300 without cleaning up the battery. The ore milled is from the mine adjoining the Florida on the west. Assayer De Forrest is acting as receiver in charge of the Texas & Georgia mine in Old Diggings. Since he assumed management the mill was put in running order and the mine worked in a systematic manner. The mill is now turning out bullion.

NEW METHOD.—*Trinity Journal*, Jan. 15: We learn from Mr. W. L. Jackson, now home on a visit, that the Lower Springs Mining and Milling Co., of Shasta county (of which company Captain Atkins is superintendent), have just put up reduction works with a furnace capable of roasting ten tons a day. The ore is first crushed in a Frisbie mill, then run through the reduction works and finally passed through an Americanized arastra. The company owns ten ledges ranging from two to four feet in width and prospecting well.

Sonoma.

MARK WEST COAL MINE.—*Sonoma Democrat*, Jan. 12: Work at King & Hill's coal mine, on Mark West creek, is being diligently prosecuted. The shaft has been opened into the hill for a distance of over 125 feet, and from every indication the prospect for striking the main ledge soon is good. One ledge of about eight inches in thickness has already been passed, and the quality of coal taken from it is far superior to that taken from the surface. It is thought by the engineer of the mine that the main ledge will be struck in a day or two.

Trinity.

HAY FORK QUARTZ.—*Trinity Journal*, Jan. 15: From Mr. C. C. Shattuck, who was in town the first of this week, we learn the following particulars in regard to recent quartz developments in Hay Fork valley: Mr. Shattuck will be remembered as the gentleman who recently purchased the Horsehoe mine from Mr. Farmer; he is also the owner of the Magdaline and is a partner in the Cyclone. A tunnel has been run in on the Horsehoe for a distance of 125 feet, and about 250 tons of ore are on the dump. The outlook for the future of the mine is very favorable. The Magdaline is situated on Kingsbury gulch and the ledge, when first found, was only one-half of an inch in width; however, a tunnel was run in on it about 80 feet and the ledge has widened to a foot. The rock carries free gold and bids fair to develop into a valuable property. A specimen shown us was very rich. The Cyclone, situated on Morgan gulch and owned by Messrs. Carter, Shattuck & Vodge, has a 6-foot ledge, which shows no free gold but prospects well. At the junction of Hay Fork and Carr creeks, Mr. Shattuck has put up a Huntington mill, and quite a little village of 13 houses (needed for the accommodation of the men and the requirements of the work) has sprung up in its vicinity. The mill has a capacity of 15 tons a day and is now running.

NEVADA.

Washoe District.

SAVAGE.—*Virginia Enterprise*, Jan. 15: 500 level—The south drift has been advanced 30 feet. For the last 20 feet of this distance have left the ore on the east side of the drift. 600 level—Shows 12 feet of ore. Now drifting north and south on it. Commenced hoisting ore through the surface last Wednesday through the Bonner shaft. 1640, or Suro tunnel level—The north drift has been advanced and timbered 65 feet; south drift, 40 feet. Both of these drifts are fine bodies of quartz and show good ore. Have extracted about 200 tons of ore from these drifts and delivered the same at the mouth of the Suro tunnel. The new gallow frame at the old Curtis shaft is about completed. Started the machinery yesterday and found the compartments of the shaft in good condition.

HALE AND NORCROSS.—1300 level—The south drift has been extended and timbered 35 feet; total distance, 230 feet. From this drift near the southern boundary two crosscuts have been started, one east, the other west. Each has been advanced about seven feet. 1200 level—The south drift has been extended 34 feet and the north drift 35 feet. East crosscut No. 1 from south drift has been advanced 15 feet; the face is in ore. 600 level—The west drift is now in 260 feet, a distance of 30 feet having been extended during the week.

POTOSI.—Are sinking the south winze on the 250 level. Passed through the ore at a depth of 50 feet and are now in clay. The upraise, same level, has been extended 58 feet. The entire distance is in good ore. Work has been stopped on account of having no room to board the ore. A crosscut has been run through a new ore body on the 250 level, 93 feet south of the Linsley drift, a distance of 48 feet, and not through the ore yet.

BEST AND BELCHER.—600 level—West crosscut No. 1 extended 12 feet; total length, 154 feet. The west crosscut No. 2 that was started at a point in the northwest drift 330 feet from the main north lateral drift has been advanced 32 feet. 800 level—West crosscut No. 4 has been extended 27 feet; total length, 202 feet; porphyry formation in the face. 1500 level—Northwest drift has been extended 27 feet; total, 202 feet; porphyry formation.

SCORPION.—Have finished repairing the machinery and shaft and started opening the new level on the east side of the shaft above the level of the water 300 feet from the surface. The miners are now engaged opening a station at this point.

YELLOW JACKET.—Everything going along smoothly, and the usual quantities of ore are being

shipped from the 1300 and 1400 levels. The old ore breasts and stopes in this mine are seemingly inexhaustible and good, effective exploration work is all the time being done toward the further development of the mine, above and below.

OCCIDENTAL.—Upper tunnel.—The south drift from the north incline winze has been extended 10 feet; total length, 71 feet. East crosscut, same level, has been extended 12 feet; total, 15 feet. North drift, same level, extended 14 feet; total, 31 feet. Extracted 15 tons of low-grade ore. Lower tunnel.—Upraise No. 2 has been extended 17 feet; total length 72 feet.

IOWA.—Both tunnels have made good progress during the week, without any change of importance to report. The upper tunnel is still passing through stringers and bunches of good gold ore.

GOULD AND CURRY.—The south drift from the main west drift, on the 425 level, has been extended 27 feet; total, 476 feet. The east drift has been extended 31 feet; total, 81 feet. The face is in vein matter.

BULLION.—The west drift, 300 level, is in about 50 feet, cut the hanging wall about 45 feet, and the face is now in quartz. The east station is finished, and a drift is being extended that way.

CROWN POINT AND BELCHER.—Extracting daily about 120 tons of ore from the former and 140 tons from the latter. Prospecting work in the upper and lower level of these mines continues.

ALPHEA AND EXCHEQUER.—Prospecting work is being actively prosecuted on the 122 level. A large body of quartz has been cut into. Everything at the new shaft working successfully.

UTAH.—472 level.—The south drift from the main west drift has been extended 36 feet; total length, 152 feet.

CHOLLAR.—The old shaft has been repaired to a depth of 335 feet. Prospecting work has not been commenced yet.

NORTH GOULD AND CURRY.—The work of repairing the shaft continues, excellent progress being made.

Eureka District.

ORE SHIPMENTS.—*Sentinel*, Jan. 16: During the past week ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Richmond works—Adelphi mine, 3 tons; Dunderberg, 81 tons; Schenck, 6 tons; White Pine, 2 tons; Hoosac, 2 tons; Gen. Lee, 4 tons; Bullwhacker, 5 tons; Hanburg, 24 tons. Eureka Con. Co.—Reveille mine, 3½ tons.

Jefferson District.

CHLORIDERS.—*Belmont Courier*, Jan. 15: The chloriders of Jefferson are taking out very fine ore.

Hawthorne District.

FORKED STICK.—*Esmeralda News*, Jan. 15: The Lapanta Mining Co. sent out from Carson Alex. Hamilton with his forked stick to prospect for water. From the investigation made this expert declares that within a few hundred feet of the famous Lapanta mine, below it on the flat, water can be obtained at a depth of 80 or 100 feet. He also predicts that there are several streams of water in close proximity to town which may be obtained at a depth varying from 75 to 150 feet. From all his investigations he foretells that the largest volume of subterranean water is that which he finds on the flat below the Lapanta mine. If the company, upon his research, take any stock in his seemingly miraculous operations, it will doubtless locate a millsite at the point named and proceed to sink to ascertain the truth of his prophecy.

Manhattan District.

PROMISING.—*Belmont Courier*, Jan. 15: J. H. Sanders and Eli Baker are working a mine in this district that is looking very promising. The ledge is large and carries ore that assays 40 per cent lead and 90 silver per ton. The owners are sanguine that they have a big mine, as it shows better and better as they continue to open it. There are numerous valuable locations in this district unworked at present.

Mount Ross District.

THE CLIFF MINE.—*Silver State*, Jan. 16: Nick Frayer returned yesterday from Spring City and states that 8 miners have been put at work on the Cliff mine, which is situated across the canyon from the Paradise valley, and is supposed to be an extension of the same. The formation at the Cliff mine is similar to that in which the Paradise Valley, Wild Goose and Bullion mines exist, and the ore, too, is said to be of the same character. Nick Frayer ships a lot of ore from the Cliff mine to the Reno Reduction Works to-day.

Silver Star District.

THE MINES.—*Esmeralda News*, Jan. 15: It appears to be the determined purpose of the pioneers of this district to avoid newspaper notoriety. The district is in this county, bounded on the west by Garfield, east by Gillis and Santa Fe districts, and the railroad runs through it. Its principal mines are owned by a corporation organized under the laws of the State of New York, known and called the Western Nevada Copper Co. Its mines are chiefly copper, carrying both gold and silver. The ledges are very large and well defined, upon which in time past considerable work has been done, and, while the property now remains idle, the assessment work for last year having been performed, the company is contemplating starting work this summer, and intend erecting a furnace to reduce its ores. The mines are situated some five miles south of Luning.

Tuscarora District.

TORNADO CONSOLIDATED.—*Times-Review*, Jan. 10: Tunnel extended during the week, 8 feet; quartz hard and flinty. Have started drifts on west lateral vein. This vein has a free quartz giving fair assays in gold (sulphurets).

BELLE ISLE.—During the week, the Belle Isle and Navajo joint crosscut west, 150-foot level, has been extended 22 feet. East crosscut, same level, has been extended 4 feet. Rock continues very hard.

NAVAJO.—No. 2 winze on east lateral, 350-foot level, has been sunk 8 feet. North drift on new vein, 150-foot level, has been extended 16 feet; south drift on west vein No. 2 has been advanced 11 feet.

NEVADA QUEEN.—Slow progress has been made sinking the shaft on account of breaking link on the

engine, causing a loss of three days. Shaft has been sunk 11 feet, total depth 204 feet, and will be pushed on down to the 350-foot level. Water has increased very materially, not so great but what it can be handled easily. West crosscut No. 1 has been advanced 35 feet, all requiring to be timbered.

NORTH BELLE ISLE.—A crosscut has been started on 150-foot level, opposite the shaft; drove 6 feet. South drift from No. 3 crosscut, same level, has been advanced 4 feet. North gangway, 400-foot level, has been driven 39 feet. Rock looks favorable for making good progress.

Union District.

CHANGED HANDS.—*Belmont Courier*, Jan. 15: George W. Veach's series of mines have changed hands and work has been commenced on them. They are considered valuable, and when they were last worked were good bullion producers.

HOPEFUL.—*Belmont Courier*, Jan. 15: Lively times are expected in Union mining district this coming spring and summer. The Alexander mill, Grantsville, is expected to drop stamps about the middle of this month on tailings.

ARIZONA.

PECK.—*Prescott Courier*, Jan. 10: Mr. W. C. Dawes has engaged teams to haul wood to the Peck mill, and hopes soon to have the mine dry and to keep the mill running night and day. He says he is certain to make a fortune out of the mine, and we believe he will. Col. H. A. Bigelow, of Hassayampa district, gives good reports of mining in his section. A letter from Tip Top says that the mill is running; company shipping plenty of silver. Pack trains, with rich ore, arrive in Prescott almost every day from the mines. Banks and assay offices handled \$20,000 in gold and \$37,000 in silver last week.

GOLD ORE.—*Mohave Co. Miner*, Jan. 16: Messrs. Merrill and Flynn are taking out some fine gold ore from the Silver King mine, at Music Mountain, on which they have a lease. H. W. Hitchcock is also taking out ore from another place in the same mine. Messrs. Sample and Shrope had half a carload of Juno ore worked on Tuesday, which netted them a nice little amount. Geo. Mendes also had a half carload, and Bruno Seidel a small lot from the same mine, on which all parties are working on leases. Chas. Cunningham left for the East last night with five tons of ore from the Ellen Jane and Tummanotta mines, Music Mountain district, which he intends to exhibit to the stockholders of the company in Washington. He expects to return with a mill and machinery to work the mines. Messrs. Monaghan and Murphy had a carload of ore from the Black Metal mine worked yesterday, which went away up. This mine is in the Black Metal district, near Aubrey Landing.

NEW CLAIM.—*Thomas Stone Democrat*, Jan. 17: J. P. Cooper and Thomas L. McCracken located a mine near the Emerald on the first of the year, and have been working since that time and are meeting with the greatest of encouragement. They have struck a vein that assays very highly, while the quantity is inexhaustible, being twelve-inch vein. McAllister and McCone are engaged in the construction of a complete hoisting apparatus for Gage and Leach, to be used in working one of their leased mines. A large Worthington compound mine pump has been built for the Copper Queen Con. M. Co., of Bisbee.

COLORADO.

COAL.—*Elk Mountain Pilot*, Jan. 15: The Denver papers have lately been telling the public about the wonderful coal fields around Canyon City, and what wonderful strides is being made in the mining and shipment of the same. In the excitement we wish our Denver contemporaries would not lose sight of the fact that the very best coal in quality not only in the State, but west of Pennsylvania, is mined and shipped right from Crested Butte. It is a well-known fact that three years ago when the C. C. and L. mine was closed down temporarily on account of the explosion there was great difficulty in making schedule time on the fourth division of the Rio Grande railroad. There is no coal in the country to compare with this coal for steam and heating purposes, and the time will come when the great coal supply point of the West will be here or in this vicinity.

MINING AND MILLING.—*Idaho Springs News*, Jan. 16: Robert Turner has taken a lease and bond on the Patten lode, Virginia canyon, and will proceed to open it up. The big pump in the Freeland, which supplanted the smaller ones, is doing satisfactory work. Now that the holidays are over and the miners returned to work, good reports are coming in of new strikes. The sampling works are doing a large business. We learn from good authority that the parties working the Eclipse lode have made a strike of rich mineral. Mr. James Sandidge went to Denver Tuesday, to look up a plant of machinery for the Squirrel gulch properties lately taken hold of by Eastern parties. Fatty Keiffer has been up at the Alice mill, on Fall river, putting in a double tramway from the mine down to the mill, which works splendidly. Capt. Jim Daily, of the famous Joe Reynolds mine on Silver creek, was in town last week ordering timbers for the Red Elephant mines, which have lately been acquired by Mr. Joe Reynolds, of Chicago. The shaft will be timbered from top to bottom, nearly 600 feet, and will be one of the best in the State. Mr. Reynolds always knows a good thing when he sees it, and generally gathers it in. We look for a big output this coming summer.

IDAHO.

WOOD RIVER NOTES.—*News-Miner*, Jan. 12: Camas No. 2 shipped 114 ounces of gold, Tuesday. All the stamps are dropping and mine looking splendid. Capt. Gunn will have stamps dropping on ore from Wolcott about the 20th. Plates are on the way from Chicago, and machinery will be set in motion as soon as they arrive. Minnie Moore resumed shipments on Monday. Mine was shut down to make some repairs on machinery. A full crew is now at work, and two cars per day will be sent out. It is reported that the Noy Aug is under bond for \$50,000. The mine is one of the best on Wood river and has been worked in a systematic manner. There is a good showing of ore and the purchasers will certainly get a good piece of property. Steve

James has ore in the Montana. Snow Fly is producing some nice ore. E. V. Hall and partners have ore in the Comstock mine, near Broadford. Montezuma shows 15 inches of \$150 ore. All the Smoky mines are looking well. King of the West reports six feet of ore. Idaho Democrat has a streak of nice pay ore, but will not ship until spring.

TREASURE-BOX.—*Coeur d'Alene Record*, Jan. 11: On Sunday the Bank of Murray received the product of another week's work at the Treasure-Box, being about 110 ounces and worth \$1600, which the owners assure us was taken out of less than 300 pounds of quartz, all the crushing being done in a single-hand mortar. In this way they have taken out about \$5000 within the last three weeks. Another specimen of quartz, or rather almost solid gold, weighing 22 ounces, may be seen at the Bank of Murray. It is a beautiful piece, worth about \$250. One reads of these marvelous things somewhat suspiciously. Until recently we have felt extremely anxious that capital should come in to develop our mines. This anxiety has entirely ceased. It is coming, and will hasten forward, and cannot be impeded. It is here already in the strong right hands of the prospectors themselves. Now that a single man can pound out from \$1500 to \$2000 in six days, he need be in no greater hurry to get his money out of this mine than he would be from the best banking-house in the world. The Treasure-Box does not stand alone in its marvelous richness. Equally rich specimens have been taken out of the Buckeye Boy and other locations which we are forbidden to mention. Prospectors have more than ever to encourage them to work. So far, every vein or strata which has been followed has shown rapid improvement, and good pay if not great fortune is almost certain to be the reward of well-directed development work.

THE EMMA MINE BONDED.—*I. B. Ferguson*, who owns seven-eighths of the Emma mine, and C. C. Nason, owner of the other one-eighth, have bonded it to John Hackett for \$15,000. Development work is already begun and will be pushed as rapidly as it can be economically. A. R. Thompson has charge of the work. From the date of the discovery of the Emma, it has been considered a valuable prospect, and while the price agreed upon is a nice little raise for Messrs. Ferguson & Nason, it will be unlike all the other prospects which have been proven if it does not turn out ten-fold to the purchaser. The working of this mine is a most encouraging feature to Murray, as its mills will be at farthest, almost within the limits of the town. The mine is located on the divide between Gold Run and Alder gulches, a distance of not more than three-quarters of a mile from the center of town. It will be worked from the Gold Run side, and the mill must, from necessity, come very near.

LITTLE ORE IS SHIPPED.—*Wood River Times*, Jan. 12: All ore shipments are about suspended on Wood River at present, owing to the expiration of the contracts made with the Omaha and Denver Smelting Works. The Philadelphia Co., of Ketchum, is at present the only buyer in this market. This fact has caused heavy producers like the Queen of the Hills to cease shipping until a new understanding can be reached. This will be some time during the present month, doubtless, and shipments will then be resumed.

A FOURTH MILL FOR THE GOLD BELT.—*Ole Rorem* will leave Hailey for the Eastern States, to order a first-class mill for the Donovan group of mines, on the Gold Belt. Mr. Rorem will probably be gone about six weeks. This will make the fourth mill on the Gold Belt before the end of next summer, and as the Tip Top and Deadwood people will doubtless also build a mill before next fall, the Gold Belt will, by that time, be well started.

MONTANA.

RED BLUFFS.—*Inter-Mountain*, Jan. 15: Red Bluffs feels sure of the erection of a quartz mill and perhaps smelting works early in the spring. Some New York capitalists have recently bought two mines there, and will, it is expected, buy others. They state their intention of working the ore in their own works to be built in the vicinity. The ores from the mining districts of the Belt mountains—Neihart, Barker, Wolf creek and Yogo—are described as follows: Neihart, high-grade milling silver; Barker, smelting silver-bearing ores, some being heavy in lead, also large carbonate deposits; Wolf creek, smelting, milling, and free-milling ores of gold, silver, copper and lead; Yogo, free-milling gold-bearing ores. A correspondent says that the Neihart camp is lively and nobody is idle. The Hudson concentrator is about completed. The building is 40x150 feet, capacity 100 tons per 24 hours. It is not stated when it will start up. There is a large gang at work on the flume. The small concentrator is running finely. Some of the ore works to perfection, but some cannot be worked to very good advantage, but the trouble will soon be remedied. Wilson & Wisley have just completed their contract of sawing for the Hudson Company 250,000 feet of lumber. The mines are improving as they are worked.

A PLACER COMPANY.—*Salt Lake Tribune*, Jan. 15: Fifteen years ago, John Snell, the builder, was up in Montana engaged in placer mining, which he left for the purpose of coming here to build the Walker house. While engaged in building in this city during the years since then, he often thought of those placers, but it was not until a short time ago that he went back to prospect. He is now in the city for the purpose of organizing a company, and steps have been taken which will soon bring this about. The placers are on Quartz creek, which empties into the Missoula river, about 50 miles below the town of Missoula, and he describes the gravel to be from 30 to 40 feet thick, with one place about 600 feet long that is three or four times that deep. The gold is described as being in large pieces and nuggets. Messrs. Snell, Lynch, Sprague and Thomas are the promoters of the company soon to be organized, and what was too big a mining operation to undertake 15 years ago will be made now through a strong company.

OTHER PROPERTIES.—A letter received from Montana makes the following reference to mining operations about Bannock: Dr. J. S. Meade & Sons are working a force of 11 men on the Polaris, and have a fine showing of mineral in sight. Since August, 1885, there has been shipped from this mine ore to the value of upward of \$40,000, and there is now on the dump between 1500 and 1600 tons of

ore that will average over 20 ounces of silver per ton. The Kent Mining Co. are working a number of men in the Blue Wing district, with encouraging results. Wm. E. Galigher is there looking after the interests of the company. The Eclipse mine, in Elk Horn district, owned by S. D. Mills, has a showing of high-grade silver and lead ore. Mr. Bemis has good pay in the old Dakota mine, one-half mile below Bannock. The Bannock Consolidated Mining Co. is working a small force on the Shenon group of mines.

THE CHAMBERS SYNDICATE MINES.—*Butte Inter-Mountain*, Jan. 13: Right of way has been secured by the Montana Railway Company for a branch line deflecting from the present Walkerville road a short distance west of Main street and running directly to the Chambers syndicate mines—the Mountain Consolidated, Wake-up-jim, Green Mountain, High Ore, and Modoc. The syndicate is soon to start work on these properties, and the purpose is to ship the ore to Anaconda for treatment. The *Review* says, referring to the matter: In this connection it may be well to state that the Chambers syndicate has acquired control of the new concentrator and stamp mill recently erected by the Anaconda company at this place, or have secured a lease. The new works will be operated separately from the Anaconda smelter. It is generally understood that the recent improvements made by the Anaconda management in the old concentrator, and the addition of a steam stamp, will enable the upper concentrator to furnish all the concentrates that the smelting furnaces can treat. This belief is founded on the increased daily shipments of ore, and on the fact that since the smelter has been started up all the furnaces have been busy all the time except when closed down for necessary repairs.

NEW MEXICO.

KINGSTON AND HERMOSA.—*Socorro Bulletin*, Jan. 15: To Dr. Wm. Driscoll and A. D. Coon, of this city, who have returned from the southern camps, we are indebted for the following data: Hermosa is a live, prosperous and progressive camp. The Palomas Chief is showing up remarkably well, and Richard Mansfield White is dumping pay mineral in a lively way. He is now preparing a shipment for Socorro. The Antelope, Big Tree, Ocean Wave, Eagle, Pelican, Atlantic Cable and Humming Bird, among other properties, are sacking ore for shipment to this city. Most of the boys in camp, however, are confining themselves to development work. The owners of the American Flag and Flagstaff will at once invest \$20,000 in the development of their ten well-known properties. The camp is growing rapidly and is in a fair way of soon taking its place among the standard mineral producers of the Southwest. Tom Dwyer is running the gold mill at Hillsboro successfully.

OREGON.

NUGGET.—*Jacksonville Times*, Jan. 14: Ingram & Baker, of Willow Springs, picked up a nice nugget of gold worth nearly \$30 a few days since. Klippel, Baume & Co. will soon commence crushing quartz from their own ledge. There is already considerable of it on the dump. A. W. Sturges, of Forest creek, has recently bought 2000 feet of hydraulic pipe, manufactured at K. Kubli's establishment, which is now being put in position. At a meeting of the Jacksonville Mining and Milling Co., held at the office of S. J. Day, in this place, yesterday, the following officers were elected: Directors, T. F. McKenzie; J. G. Birdsey, J. T. Roloson, D. L. Curtis and David Cronenmiller; secretary, S. J. Day; treasurer, T. J. Kenney. It was decided to continue work on their tunnel.

UTAH.

PARK NOTES.—*Record*, Jan. 15: Since the last heavy snowstorm mining operations have been seriously retarded. The roads are blocked so that ore shipments have been limited the past week. In a few weeks the large, new shops of the Ontario and Daly companies, next to the Marsac mill, will start up and begin to do all sorts of mechanical work. The motive power will be generated by means of the large turbine water-wheel, and ample surplus power will be at hand to operate the electric light dynamo. Arthur Brown, owner of the Plutus mining claim, near the Crescent dam, has brought suit against the Crescent Co. for \$1000 rental per annum, since October 1, 1885, and for an injunction forbidding the defendants using his ground for a dump and ore-house. The Crescent Co. has brought suit in the Third District Court against the Wasatch Mining Co. to settle some doubts about the purchase of the latter's property by the former company last September, and to adjust the alleged irregularities in the description of the property as named in the deed.

ORE AND BULLION SHIPMENTS.—During the week the Crescent shipped about 168,000 pounds of first-class ore. For the week just ended the Mackintosh sampler received 351,150 pounds of Ontario and 133,650 pounds of Daly ore; total, 487,800 pounds. On Wednesday there was turned out of the Marsac mill seven bars of Daly bullion, containing 7863 fine ounces of silver. The Ontario shipped 38 bars of bullion, on the 8th inst., containing 22,501.99 fine ounces, and on the 13th the product was 25 bars, containing 14,849.83 fine silver ounces.

REVIEW.—*Salt Lake Tribune*, Jan. 15: The week has been stormy, with quiet business in all mining matters. The receipts for the week aggregated \$194,747.05 in value, of which \$148,596.55 was bullion and \$46,150.50 was ore. The receipts of the previous week were \$125,001.34 in bullion and \$90,780.11 in ore, a total of \$215,781.45. The Ontario product for the week was 25,068 ounces of fine bullion, and \$983.45 of ore sales; a total of \$35,921.25. The Daly produced during the week 15 bars of bullion, 21,446.42 fine ounces, and sold \$6916.27 worth of ore, a total of \$28,362.69. Fine bar receipts of the week were \$46,431.70; base bullion, \$19,700; fine silver bars, \$6500; Dore bars, \$14,389. The Hanauer smelter for the week turned out \$10,095 in bullion. The Stormont sent up, on the 6th, silver bars to the value of \$7755. The Bannock sent down during the week \$8360 in bullion bars. Selected lead to the value of \$5934.65 was received. Ore receipts here during the week were \$23,675.50 by Wells, Fargo & Co.; \$19,160 by McCormick & Co.; \$3315 by T. R. Jones & Co.



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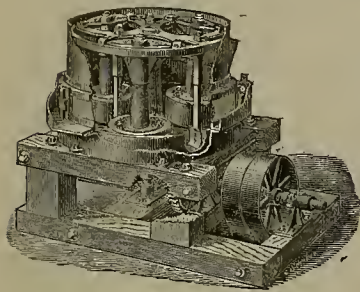
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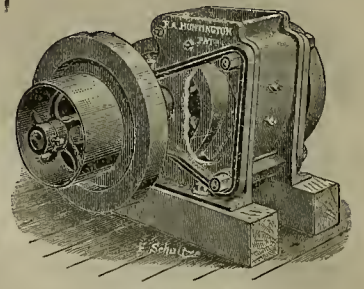
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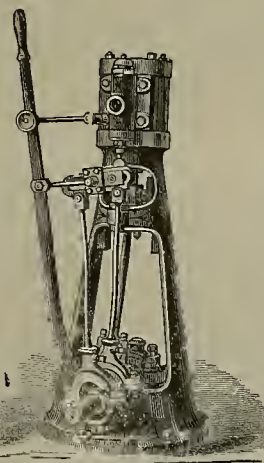
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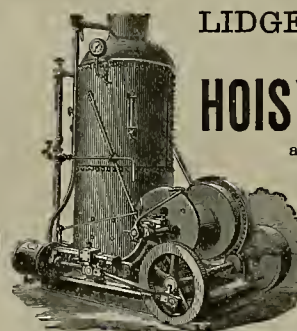
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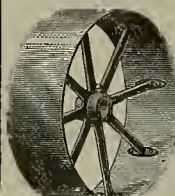
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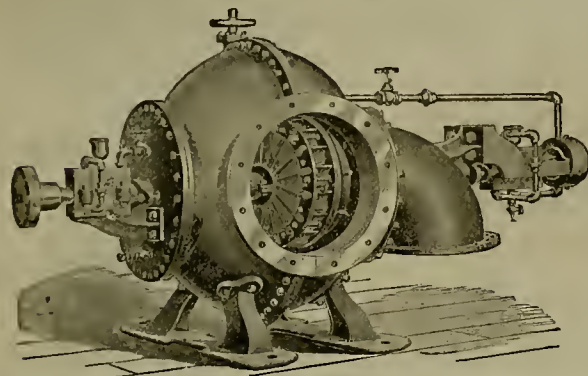
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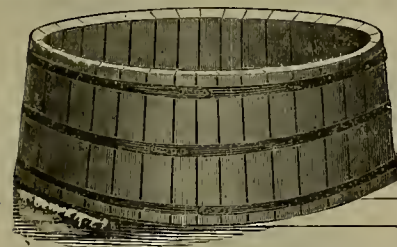
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A circular showing the full table of contents of this volume will be sent free of postage to any one in any part of the world who will furnish us with his address.

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List of U. S. Patents for Pacific Coast Inventors.

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From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

- FOR WEEK ENDING JANUARY 4, 1887.
- 355,371.—PATTERN FOR HORSESHOES—J. E. Bingham, Walla Walla, W. T.
 - 355,586.—VENTILATING CARS—Buckley & Koeft, S. F.
 - 355,587.—VENTILATING CARS—Buckley & Koeft, S. F.
 - 355,436.—WIRE CLOTH STRETCHER—P. A. Buell, Stockton, Cal.
 - 355,602.—GOPHER GUN—F. L. Emerson, Brentwood, Cal.
 - 355,493.—CAR AXLE—W. J. Murray, Jolon, Cal.
 - 355,472.—ELECTROLYTE—W. Y. Quinby, S. F.
 - 355,655.—STEAM BOILER—G. H. Sutherland, Walla Walla, W. T.
 - 355,556.—SELF-OILING PULLEY—E. S. Sutton, Snohomish, W. T.

- FOR WEEK ENDING JANUARY 11, 1887.
- 355,904.—WINDOW VENTILATOR—P. Abrahamson, S. F.
 - 355,905.—REVERSIBLE WINDOW SASH—Adelson & Frell, S. F.
 - 355,857.—ANIMAL TRAP—N. C. Boynton, Los Angeles, Cal.
 - 355,679.—DRILLING OR SLOTTING MACHINE—A. F. Brewer, S. F.
 - 355,680.—LATCH—W. B. Cantrell, Portland, Ogn.
 - 355,869.—WINDMILL—S. M. Fulton, Galt, Cal.
 - 355,925.—MACARONI MACHINE—P. Giovannini, S. F.
 - 356,044.—ORE CRUSHER—F. A. Huntington, S. F.
 - 355,937.—LAYING-OUT MACHINE—E. A. Jerome, East Portland, Ogn.
 - 356,045.—FURNACE—H. S. Jory, Salem, Ogn.
 - 355,940.—TRACTION ENGINE—W. L. Leland, Oroville, Cal.
 - 355,791.—ELECTRIC ANNUNCIATOR—Paul Seiler, S. F.
 - 356,014.—ROD PACKING—Small & Warner, Tacoma, W. T.
 - 355,726.—WINDMILL—J. B. Sohn, Visalia, Cal.
 - 355,932.—TELEPHONE TRANSMITTER—J. C. H. Stul, S. F.
 - 355,848.—ROLL FOR ROLLING NAIL PLATES—Geo. T. Walker, Napa, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dawey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MACARONI MACHINES.—Philip Giovannini, S. F. No. 325,926. Dated Jan. 11, 1887. This is an apparatus for the manufacture of macaroni and similar pastes. It is a combination of pressure cylinders with pistons, and paste cylinders suspended on trunnions. The machine is operated by water power.

WINDOW OR DOOR VENTILATOR.—Peter Abrahamson, S. F. No. 355,904. Dated Jan. 11, 1887. This invention relates to the class of ventilators for window sashes, transoms, doors, and other similar communications between apartments and the outer air. The object is to provide for the perfect and easy ventilation of apartments through the usual avenues of communication with the exterior and without interfering with the devices, such as windows, transoms, doors, etc., usually controlling said avenues.

Academy of Sciences.

The regular semi-monthly meeting of the California Academy of Sciences was held on Monday last, President Harkness in the chair. Dr. C. M. Richter, Chas. H. Hinton, N. W. Spaulding and W. T. Biggett were elected to membership, and Walter E. Bryant, the young ornithologist of this city, was proposed.

Dr. H. W. Harkness, the newly elected president, read an inaugural address.

Dr. E. L. Greene read an account of a botanical exploration of Santa Cruz island, off the coast of California.

Dr. H. Bahr read a paper "On Certain Changes in the Flora and Fauna of California Since 1850."

A vote of thanks was passed to the retiring treasurer, E. Ish Brooks, who had filled the office satisfactorily for 19 years. A hearty and unanimous vote of thanks was also passed to the retiring officers and trustees for their faithful and gratuitous services during the past 16 years.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Eureka Con., Jan. 11, \$11,593; Con. Virginia and California, 17, \$97,276; Sierra Buttes (for December) \$35,000; Young America (for December) \$21,000; Moulton, 14, \$14,400; Hanauer, 11, \$890; Bannock, 12, \$3580; Hanauer, 13, \$2090; 14, \$4260; 15, \$4600; Bannock, 16, \$2850; Hanauer, 16, \$7009. The bullion and ore shipments from Salt Lake City for the week ending Jan. 16th, were: 17 cars bullion, 435,572 lbs.; 8 cars lead, 127,070 lbs.; 19 cars silver ore, 576,950 lbs.; 10 cars copper ore, 250,330 lbs.; total, 52 cars, 1,369,822 lbs.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.				
COMPANY.	LOCATION.	No. Am't.	LEVIED.	DELINQ'T. SALE.
Alpha Con. M. Co.	Nevada.	21.	50.	Jan. 12, Feb. 17.
Caledonia S. M. Co.	Nevada.	41.	15.	Nov. 26, Dec. 22.
Champion M. Co.	California.	23.	10.	Nov. 29, Jan. 7.
Columbus Con. M. Co.	Nevada.	5.	10.	Dec. 22, Jan. 27.
Dicator Con. M. Co.	Nevada.	1.	01.	Dec. 15, Jan. 2.
Excelsior W. & M. Co.	California.	10.	1.50.	Jan. 3, Feb. 3.
Goldconda M. Co.	California.	2.	03.	Dec. 22, Jan. 27.
Indian Springs Drift M. Co.	Cal. Florida.	7.	30.	Dec. 30, Jan. 31.
Kittling Flat M. Co.	California.	2.	2.00.	Jan. 5, Feb. 14.
Live Oak D. G. M. Co.	California.	4.	10.	Dec. 7, Jan. 15.
Mides G. & S. M. Co.	Nevada.	3.	25.	Dec. 16, Jan. 22.
Mexican C. & S. M. Co.	Nevada.	33.	25.	Jan. 4, Feb. 9.
North Belle Isle M. Co.	Nevada.	11.	50.	Jan. 12, Feb. 15.
Nevada Queen M. Co.	Nevada.	1.	30.	Jan. 11, Feb. 8.
North Sierra Nevada M. Co.	Nevada.	4.	20.	Nov. 26, Jan. 21.
Navajo M. Co.	Nevada.	16.	25.	Jan. 7, Feb. 10.
Orleans Con. M. Co.	Nevada.	1.	05.	Dec. 6, Jan. 12.
Phoenix Con. M. Co.	California.	1.	60.	Dec. 6, Jan. 10.
Pneumatic M. Co.	Nevada.	1.	10.	Jan. 15, Feb. 1.
Sierra Nevada S. M. Co.	Nevada.	87.	25.	Jan. 4, Feb. 9.
Yosemite Queen M. Co.	California.	2.	22.	Dec. 4, Jan. 11.

MEETINGS TO BE HELD.				
NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.
Christy M. Co.	Utah.	G. B. Spinney.	310 Pine St.	Special.
Chico Creek M. Co.	W. Idaho.	W. Willis.	303 Montgomery St.	Annual.
Head Center Con. M. Co.	Arizona.	J. W. Pew.	310 Pine St.	Annual.
Manhattan S. M. Co.	Nevada.	J. Crockett.	327 Pine St.	Annual.
William Penn M. & M. Co.	Nevada.	J. J. Scoville.	309 Montgomery St.	Annual.

LATEST DIVIDENDS—WITHIN THREE MONTHS.				
NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	PAYABLE.
Cal. California & Va. M. Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50.
Martin White M. Co.	Nevada.	J. J. Scoville.	309 Montgomery St.	25.
Paradise Valley M. Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	10.
Silver King M. Co.	Arizona.	J. Nash.	328 Montgomery St.	25.

Mining Share Market.

There has been no unusual excitement in stocks for the past week, though the transactions are still rather large. Con. California and Virginia is shipping bullion, and a dividend of \$1 is expected shortly. The situation at the middle mines is very encouraging. The prospecting work being done on the 1200 level of the Hale and Norcross shows a decided improvement in the character of the formation, and it looks well.

The old Savage, or, as it is generally termed, the Curtis shaft, is again in successful working condition after a cessation of operations for over four years. Good ore is being extracted from several levels of the mine. In the Potosi, a crosscut that is being run through a new ore body on the 250 level is reported. On the Divide, prospecting work is being actively prosecuted in mines there. A large body of quartz has been cut into the 122 level of the Alpha, and in Gold Hill the usual quantities of ore are being extracted from the Crown Point, Belcher, Yellow Jacket and Kentuck mines.

San Francisco Metal Market.

[WHOLESALE.]		THURSDAY, Jan. 20, 1887.	
ANTIMONY—French Star.	9 1/2 @	—	8
BORAX—San Bernardino.	—	—	5
Amargosa.	—	—	5
IRON—Glengarry.	—	—	23 00
Eglington, con.	—	—	22 00
American Soft, No. 1, ton.	—	24 00	24 50
Oregon Pig, ton.	—	21 00	23 00
Copper Cap, No. 1 & 4.	—	22 00	23 50
Clay Lane White.	—	21 50	—
Shotts, No. 1.	—	23 50	—
COPPER—	—	—	—
Bolt.	25 @	—	23
Shedding.	12 @	—	13
Ingot.	—	—	13
LEAD—Pig.	4 75 @	—	5
Bar.	5 25 @	—	5 50
Sheet.	8 @	—	—
Shot, discount 10% on 50 bag.	Drop.	8 1/2 @	—
Buck \$ bag.	1 85 @	—	—
Chilled, do.	2 05 @	—	—
ZINC—German.	8 @	—	9
Sheet, 7x3 ft, 7 to 10 lb, less the cask.	35 50 @	—	39 50
QUICKSILVER—By the flask.	1 05 @	—	—
Flaska, new.	1 05 @	—	—
Flaska, old.	85 @	—	—
TINPLATE—Coke.	4 90 @	—	4 95
Charcoal.	6 25 @	—	6 50
SPECIAL—Glengarry.	14 @	—	15
Black Diamond, ordinary sizes.	10 @	—	—
Plow.	4 @	—	5
Machinery.	5 @	—	6
Sanderson Bros.	10 @	—	—

New York Metal Market.

Telegraphic advices dated Jan. 20th give the following New York prices:

BAR SILVER—\$1.02 3/4 per oz.	
BORAX—5 1/2 @ 6 1/4 c.	
COPPER—LAKE—\$11 1/2.	
IRON—No. 1, \$19.00 @ \$19.50.	
LEAD—\$4.50.	
QUICKSILVER—\$4 @ \$5.00.	
The following is the latest by mail from the "New York Metal Exchange Market Report":	
COPPER—Steady, spot closing at 11.50 @ 11.70.	
Transferable Notices (Lake) issued at 11.55.	
Transferable Notices (Chili Bars) issued at 13.10.	
LEAD—Firm at \$4.39 @ 4.50 spot. Transferable Notices issued at \$4.40.	
TIN—Quiet at \$22.40 @ 22.55. Transferable Notices issued at \$22.75.	
Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.60 @ 22.70; Billiton Tin, \$22.75 @ 23.10; Banca Tin, \$22.75 @ 23.50; Baltimore Copper, \$10.75 @ 10.95; Orford Copper, \$10.75 @ 11.00; P. S. C. Copper, \$10.50 @ 11.00; Foreign Lead, \$4.40 @ 4.80; Foreign Spelter, \$4.35 @ 4.75.	
MAKER'S PRICES—At tidewater. 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$21.00 @ 21.50; No. 2, \$18.50 @ 19.00; Grey Forge, \$17.00 @ 18.00. Hudson River, Grade No. 1, \$20.00 @ 21.00; No. 2, \$18.50 @ 19.00; Grey Forge, \$16.00 @ 16.25. Southern, Grade No. 1, \$19.00 @ 20.50; No. 2, \$18.00 @ 18.50; Grey Forge, \$17.50 @ 17.50.	

HARTSFELD SMELTER.—People at a distance need not get excited over the Hartsfeld smelter being erected here. One would judge, from the reports seen in outside papers, that it was going to revolutionize things. Wait until it runs for some time successfully, then a representative of this paper will look into it and say what merit, if any, there is in the process. Outside papers are reminded that we do not print every letter sent us by the inventor to hoon imaginary schemes.—Idaho Springs (Colo.) News.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING DEC. 30.	WEEK ENDING JAN. 6.	WEEK ENDING JAN. 13.	WEEK ENDING JAN. 20.
Alpha.	3.25	3.00	3.15	4.50
Alta.	3.00	4.85	5.50	4.00
Andes.	1.00	1.34	2.00	1.75
Argenta.	.15	.23	.20	.25
Belcher.	3.10	3.50	3.75	5.00
Bonanza.	.50	1.00	1.10	1.25
Bullion.	1.30	2.65	2.75	4.00
Baltimore.	.85	1.25	1.70	1.00
Belle Isle.	.35	.45	.40	.45
Bodie Con.	2.80	2.90	2.55	3.05
Benton.	.80	1.10	1.25	1.40
Bole Tunnel.	1.20	1.30	1.10	1.50
Bulwer.	1.60	1.10	1.60	1.35
Con. Va. & Cal.	16	22	21	24
Challenge.	1.00	2.00	3.50	2.40
Champion.	4.00	7.25	7.00	10.11
Chollar.	4.00	7.25	7.00	10.11
Confidence.	7.50	8.00	8.00	9.00
Con. Imperial.	2.00	2.00	2.50	1.75
Caledonia.	.50	.61	.65	.85
Con. Pacific.	.25	.35	.25	.35
Crown Point.	3.50	4.70	4.75	5.50
Crocker.	.90	1.00	1.25	1.20
Central.	.50	.55	.65	.60
Dudley.	.25	.25	.60	.60
East B. & B.	2.00	—	—	—
Eureka Con.	4.00	4.50	—	4.75
Excelsior.	1.25	1.70	2.65	2.40
Grand Prize.	—	.50	—	.50
Hale & Norcross.	3.30	4.11	5.50	7.75
Holmes.	2.75	2.50	2.45	2.50
Independence.	1.25	1.70	2.00	1.50
Iowa.	1.25	1.70	2.00	1.50
Justice.	2.50	2.60	3.15	2.50
Kentuck.	—	1.80	2.25	2.40
Lady Wash.	.55	1.00	.75	.80
Martin White.	—	.60	—	.60
Monaco.	4.00	5.75	7.75	6.00
Mexican.	4.00	5.75	7.75	6.00
Mt. Diablo.	—	3.50	—	3.00
Northern Belle.	—	—	—	—
Navajo.	.80	.95	.70	.80
Nev. Queen.	3.30	3.85	3.50	3.25
Ningra.	—	—	—	.50
Nev. Queen.	.75	1.00	.70	1.10
North G. & O.	—	.70	—	.75
Occidental.	2.75	4.00	3.75	6.25
Potosi.	3.50	1.50	2.25	2.15
Potosi.	3.50	1.50	2.25	2.15
Perless.	.55	.65	.75	.60
Peerless.	.40	.50	.80	.55
Phelps.	.25	.35	.40	.40
Silver Star.	—	6.50	8.75	6.25
Savage.	—	4.70	4.70	5.00
Sierra Nevada.	.50	.70	.40	.75
Silver Hill.	—	.50	.70	.55
Silver King.	—	7.00	—	—
Scorpion.	.75	.90	.85	2.00
Syndicate.	.25	.30	.25	.30
Union Con.	3.30	3.75	9.25	2.25
Utah.	4.50	5.25	5.75	8.00
Yellow Jacket.	4.80	6.00	6.00	8.50

Sales at San Francisco Stock Exchange.

THURSDAY Jan. 20, 1887.		975 Hale & Nor.	
300 Alta.	2.50	100 Iowa.	1.50
350 Andes.	1.70	100 Justice.	2.00
300 Argenta.	20c	500 Lady Wash.	.55c
1000 B. & Belcher.	11 1/2 @ 11 5/8	500 M. Ory.	.6 @ .6 1/2
550 Bullion.	3.25 @ 3.30	425 N. Belle Is.	.30 @ .31
50 Bodie Con.	3.00	50 Bodie Con.	.60 @ .61
200 Belcher.	4.00	100 N. Bonanza.	.20c
350 Baltimore.	1.10	1250 Opium.	.15 @ .16
100 Bulwer.	1.35	650 Overman.	2.00
250 Central.	.70c	100 Occidental.	4.00
700 Chollar.	.10 @ .11	350 Peerless.	.75 @ .76
100 Con. Pacific.	.30	200 Potosi.	.75 @ .76
150 Con. Va. & Cal.	.22 @ .23	200 Potosi.	.75 @ .76
250 Crown Point.	.60	100 P. Sheridan.	.25c
775 Crocker.	1.45 @ 1.46	400 Peerless.	.55 @ .56
80 Challenge.	2.25 @ 2.26	300 Savage.	.81 @ .82
100 Con. Pacific.	.30	400 Scorpion.	1.1 @ 1.1 1/2
200 Caledonia.	.70c	150 Silver Hill.	.55c
100 Excelsior.	2.25	500 Sierra Nevada.	.6 @ .6 1/2
25 Eureka Con.	.70c	600 Union Con.	.5 @ .5 1/2
100 East B. & B.	.70	100 Utah.	.6 @ .6 1/2
650 Gold & Curry.	.6 @ .6 1/2	800 Yellow Jacket.	.6 @ .6 1/2

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REMOVAL.—The California Paint Company and O. S. Orrick, manufacturers of the Averill mixed paint, colors in oil, putty, marine paints, etc., have removed to the new brick building No. 22 Jessie St., near First. They are also agents for the Santa Cruz glues and dealers in California and Eastern glues.

The new flint glass works at West Berkeley were destroyed by fire last week, but will be rebuilt at once.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

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The German Savings and Loan Society.

For the half year ending December 31, 1886, the Board of Directors of This German Savings and Loan Society has declared a dividend at the rate of four and thirty-two one-hundredths (4 32/100) per cent per annum on term deposits and three and sixty one-hundredths (3 60/100) per cent per annum on ordinary deposits, payable on and after the 3d day of January, 1887. By order.

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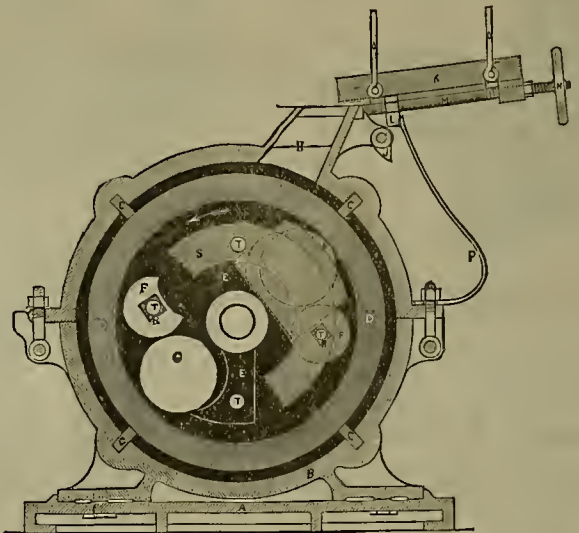
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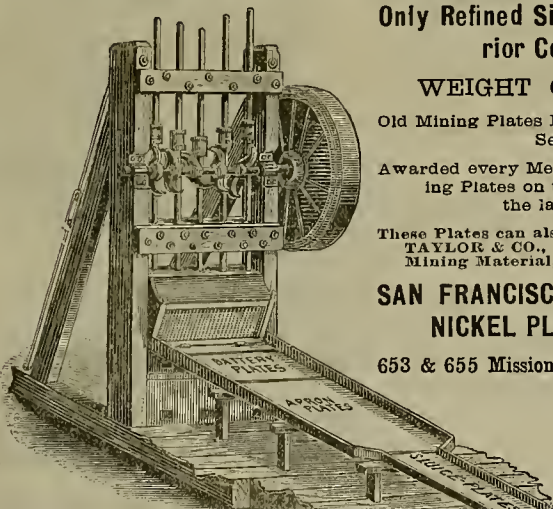
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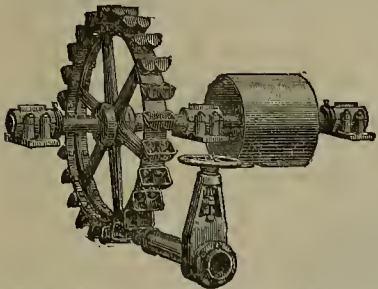
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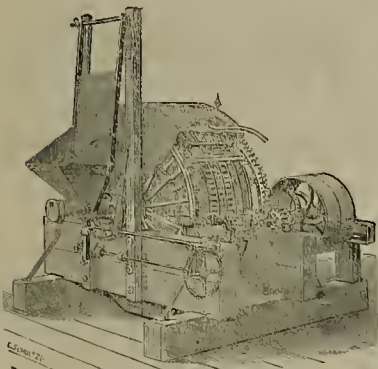
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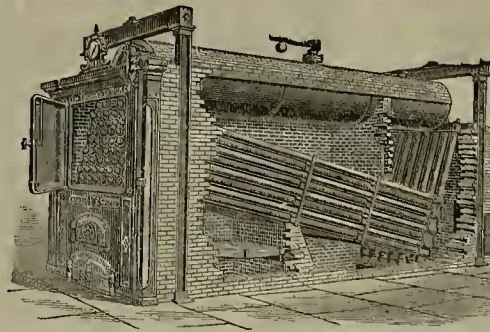
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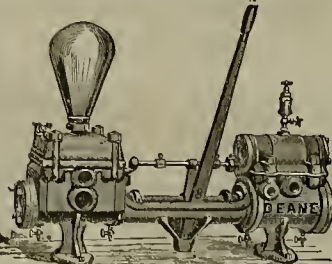
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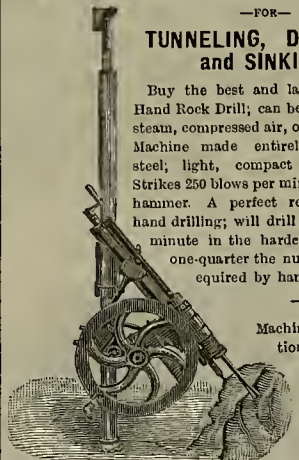
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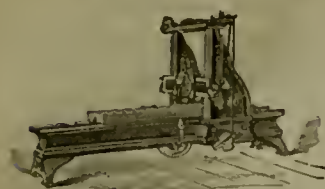
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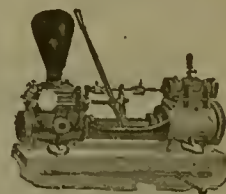


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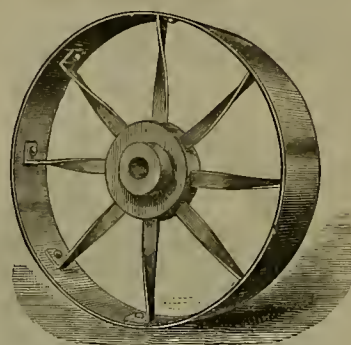
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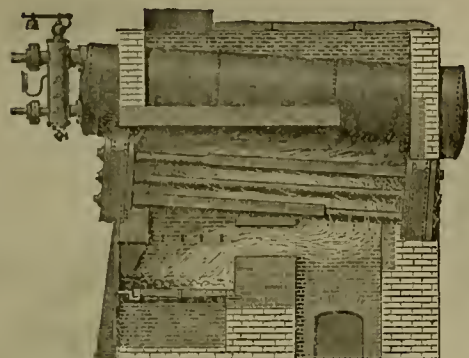
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AIR COMPRESSORS—Rope Power Transmission.
HYDRAULIC PUMPING and Hoisting Machinery.
WROUGHT-IRON WATER PIPE a Specialty. Note—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.
SAW-MILL MACHINERY of all kinds.
STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.
SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 60,000 horse power now in use.
MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

BUILDERS OF

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

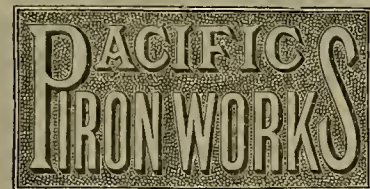
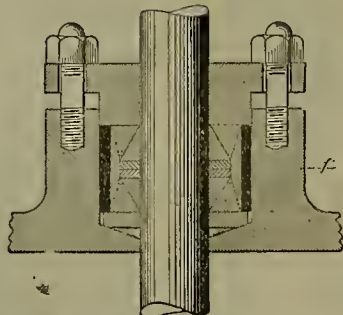
Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.

Send for Circular and Price Lists.

DUDLEY'S Patent Self-Adjusting Metallic Packing

For LAND & MARINE ENGINES.

Call and See It Working.



1850. 1885.
RANKIN, BRAYTON & CO.,
BUILDERS OF...
MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

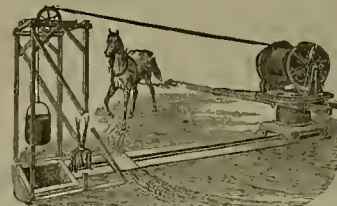
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in a GREAT NUMBER of INSTANCES, and the smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED AS VALUABLE in this class of work.



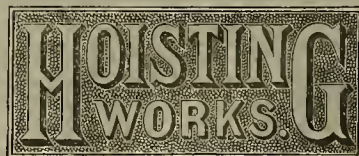
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machine EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.

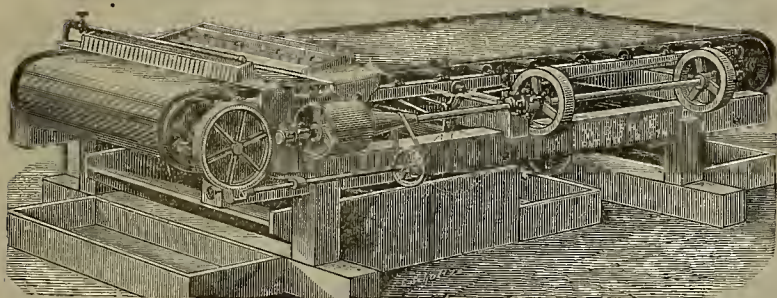


BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700-pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE OF CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



\$1,000 CHALLENGE!



THE FRUE ORE CONCENTRATOR
OR VANNING MACHINE.

PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS
(\$575.00) F. O. B.

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), London, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

Protected by patents May 4, 1883; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,
Room 7, No. 109 California Street, **SAN FRANCISCO, CAL.**

JOSHUA HENDY MACHINE WORKS.

(INCORPORATED SEPTEMBER 29, 1882)

Nos. 39 to 51 Fremont Street, - - - - - San Francisco, Cal.

MANUFACTURERS OF

NEW and Dealers in SECOND-HAND BOILERS, ENGINES and MACHINERY
OF EVERY VARIETY.

Steam Pumps of all Makes,

CENTRIFUGAL PUMPS,

MINING PUMPS.

BLOWERS AND EXHAUST FANS.

LEATHER and RUBBER

BELTING.

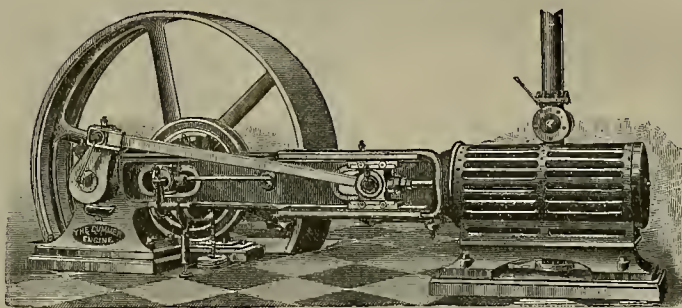
LUBRICATING COMPOUNDS and OILS
OF THE BEST MAKES.

PIPE and PIPE FITTINGS.

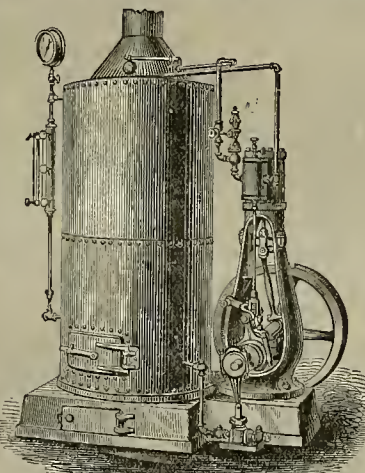
Brass Goods

AND
FITTINGS.

Hydraulic Mining, Quartz, and Saw-Mill Machinery, Hydraulic Gravel Elevators, Hydraulic Giants, "Triumph" Ore Concentrators, Automatic Ore Feeders.



SPECIAL AUTOMATIC ENGINES.
[Manufactured by the Cummer Engine Co., of Cleveland, Ohio.]



Upright Engines and Boilers Connected.

Stationary, Portable, and Hoisting
ENGINES and BOILERS.

Shafting,

Pulleys,

Boxes,

Hangers.

WOODWORKING
MACHINERY,

—COMPRISING—

BAND SAWS, STICKERS,
PLANERS, SHAPERS,
SHINGLE MILLS, Etc.

IMPROVED
Single and Double Circular Saw-Mills.

AGENTS FOR THE SALE OF

"Cummer" Engines, from Cleveland, Ohio,
Porter Manufacturing Co.'s Engines and Boilers.
"Baker" Rotary Pressure Blowers.
"Wilbraham" Rotary Piston Pumps
"Boggs & Clarke" Centrifugal Pumps.
The Volker & Felthousen Mfg Co's
Buffalo Duplex Steam Pumps.
P. Blaisdell & Co.'s Machinists' Tools

JAMES' PATENT RECIPROCATING STAMP MILL.

(PATENTED AUG. 16, 1881.)

Weight of Boss and Shoes (1200 pounds) acts on each Shoe separately. It is practically the same as the regular Stamp Mill.

Capacity, 6 Tons in 24 Hours. 4 H. P.

Parties wishing to test the Mill with any ore they may bring, will find one in operation at our works in this city.

PRICES:

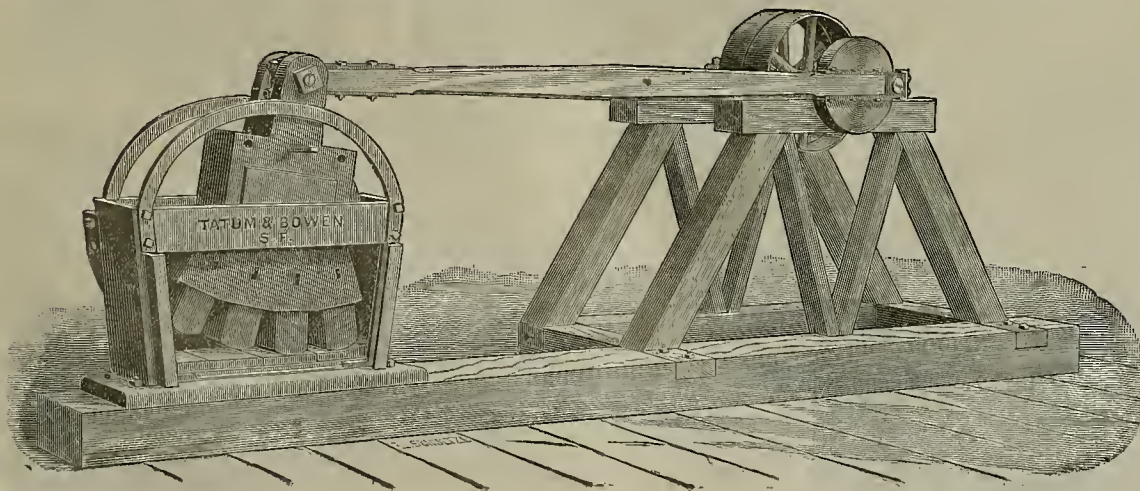
Reciprocating Stamp Mill,	\$350 00
Rock Breaker, - - -	100 00
Automatic Ore Feeder, -	50 00
Single Track Ore Car, -	40 00

SEND FOR CIRCULAR.

TATUM & BOWEN,

34 & 36 Fremont St., San Francisco.

91 & 93 Front St., Portland, Oregon.



MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

ANNUAL MINING REVIEW—TWENTY-FOUR PAGES.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JANUARY 29, 1887.

VOLUME LIV
Number 5.

Weather Lore.

Owing to the division of the California climate into a wet and a dry season, our people are much given to studying the signs of the weather during one-half of the year to their manifest neglect the other half. During the dry season, which may be said to extend from May to November, there is so little change in the climatic conditions that neither observation nor speculation is much called for, recourse to either being a work of supererogation. During all this season the sun makes his rounds through a cloudless sky, being obscured only by a narrow belt of mist that at a few points along the coast sometimes drifts in from the sea.

In exchanging salutations old Californians do not at this season of the year indulge in remarks on the weather. To do this would by them be considered absurd. Neither do they when going out in the summer carry umbrellas. The people who do this are strangers, and by the same ye may know them.

But as the dry season approaches its close the old resident feels it incumbent upon him to renew his meteorological inquiries and observations. He begins now to note the signs that tend to show the character of the coming winter, such as the increment of water in the creeks and springs, the flight of the wild geese and the movements of the hibernating animals. Has the mast been abundant or otherwise? Is the fur on the rabbit uncommonly thick? Has the squirrel laid in an extra store of nuts, or has the provident woodpecker bored more holes than usual for the reception of the toothsome acorn? Have the migrating birds made early departure for the south, or they that go north come prematurely back to their winter haunts? All this must be inquired into, and that before the advent of the wet season or there has ever as yet fallen a drop of rain. And yet this is only preliminary work; this class of facts when ascertained bearing only on the general character of the winter, as promising to be a wet or a dry one.

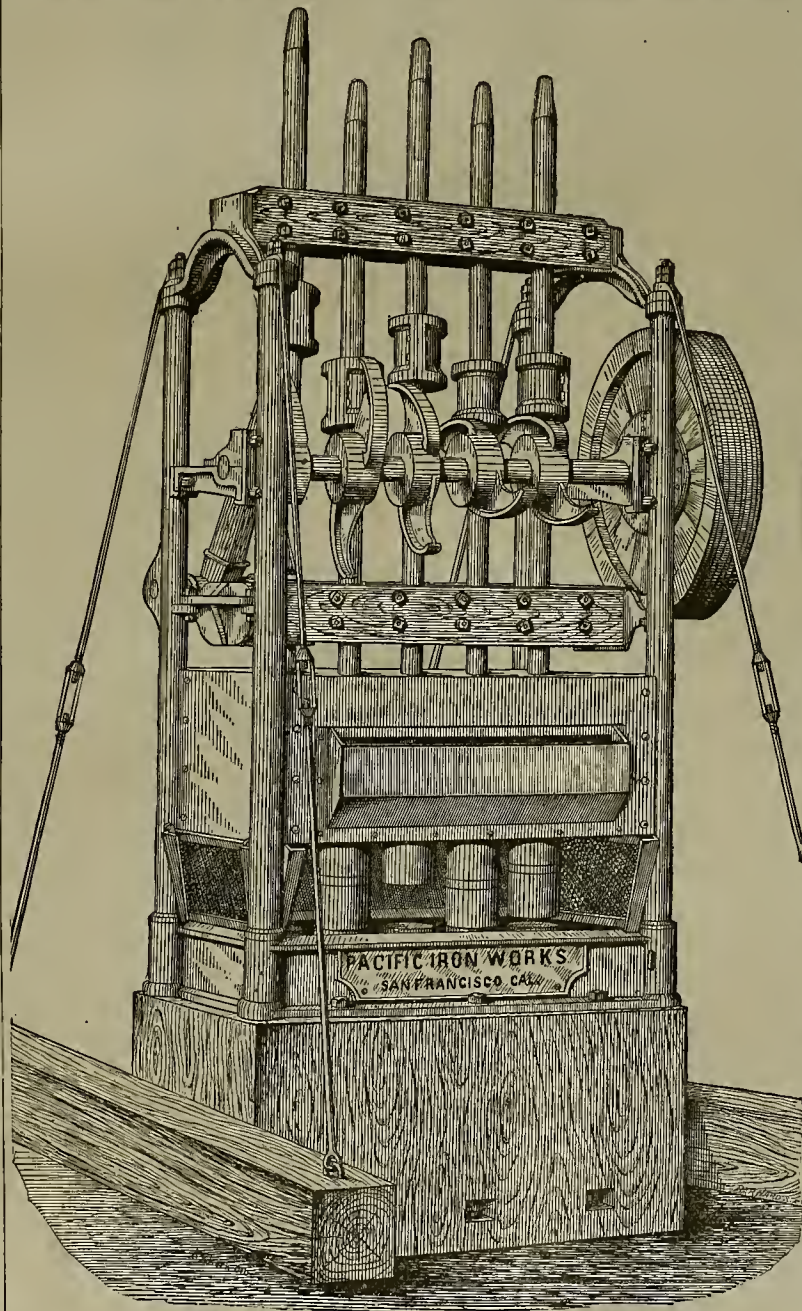
Further on, this business of prognosticating the vicissitudes of the weather taxes the resources of the old-time resident more severely. He is now required to foretell what is likely to happen in the immediate future. If the fall and early winter prove drouthy, as they have done this year, then does our ancient weather-sharp, having in mind the exceptionally dry year of 1850-51, assure us that the case is hopeless—we shall have no more rain, save only perhaps a few aggravating showers, until next autumn. If, on the other hand, the humidity is excessive, then does this man of precedents, reverting to "the fall of '49 and the spring of '50," tell us that we shall see an uninterrupted pluvial downpour extending over two or three months at least. All the meteorological phenomena point to it.

But, beside the early resident who reasons from precedent, there is another class of weather-wise folk. There is the man who sees unmistakable signs of drouth in the position of the new moon, which, if it lie on its back with both horns erect, must necessarily catch and retain the rain that otherwise would have fallen to the earth. This appearing to be a reasonable theory, old Timothy Hayseed, also Titus the younger, conclude to hold their crape for the

rise in price bound to come of a satellite situation like that. The theory of a wet moon rests on the above position of the lunar orb being reversed, or at least so far changed that the rain can run out. Then we have the man whose

member and so unsightly object, serves in this a useful purpose.

There he yet other people possessing in greater or less degree these special gifts. The several classes mentioned comprise, how-



THE RELIANCE IRON FRAME PORTABLE BATTERY

limbs are racked with rheumatism and gout, the pains of which, responding to every change of atmosphere, foretell with fearful accuracy the impending storm; and finally, the club-footed wretch, who, crucifying his pedal extremities to fashion, has covered them with corns and bunions, which excrescences act as a perfect barometer, indicating with unerring precision every approaching change of weather; and so the hoop of such person, albeit a troublesome

ever, such of the craft as seem most richly endowed with these occult powers as well as those most deeply versed in weather lore. In conclusion, it may be observed, that it remains for the members of this meteorological school to advise the honest Granger just how much rain he may expect before the present wet season is over. For such information, provided it were correct, they would entitle themselves to the thanks of the entire community.

The Reliance Iron Frame Portable Battery.

From time immemorial the stamp battery has been the recognized standard appliance for crushing quartz ores. From the crude and clumsy device of earlier times, it has been so improved and perfected that it still holds its own against pulverizers and other modern methods. The principal objection urged against the stamp battery is the expense incurred in erection, on account of the millwright work necessary in framing and construction, requiring skilled mechanics, who in many instances have to be sent long distances, involving much time and large expense, even where timber is available for this purpose. In localities where suitable timber cannot be obtained, and it has to be transported long distances, this, in connection with the cost of framing and setting up, makes a very expensive mill. It is little wonder, therefore, under the circumstances, that a substitute for the ordinary wood frame battery has been so eagerly sought for.

The "Reliance Iron Frame Battery," made by the Pacific Iron Works, of this city, and herewith illustrated, is intended to obviate such objections. In general construction it is precisely the same as the most improved form of battery ordinarily set up with woodwork, only that the frame is made of iron, which is practically indestructible in any climate, and has the great advantage of being complete in itself, as also of being transported and set up at far less cost than the wooden frame referred to.

The framework being made in sections is easily transported on mules if necessary, and a mill can be put up ready for operation in a couple of days' time, after foundations have been prepared. Where desired, the mortar can also be made in sections for such conveyance. The mortar block, as will be observed from the cut, is the same as that of an ordinary battery.

As an evidence [of the appreciation of the merits of this mill, it may be stated that more than 100 of them have already been sent out by the firm named, some five or six additional ones having been ordered frequently by parties after using them. They have come more especially into use in Mexico, Central and South America, and other foreign countries where the facilities for procuring suitable timber and having it properly framed are so meager. The many advantages of this mill for such localities as mentioned are apparent. Iron work is much more durable than wood, while the expense of transportation and setting up is greatly reduced. Beside, a timber-frame battery in warm countries is subject to such shrinkage as to materially impair its durability and efficiency. In localities where timber is abundant and facilities for working it ample, this style of battery is often preferred.

Another important feature of this mill is its large crushing capacity, it having a discharge on both ends as well as on both sides; the capacity is thus greatly increased. It is equally effective on gold or silver ores with either wet or dry crushing. The ordinary battery is of 750-pound stamps. A lighter size is made for prospecting purposes with 500-pound stamps.

An Indian died recently at San Diego who was positively known to be 110 years old.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Blackburn District Mines.

Little Lost River Region, Idaho—A New Mining Section of Great Promise.

EDITORS PRESS:—The Blackburn mining district is situated along the east side of Little Lost river, Altnrae county, Idaho. The mountains in the district reach an elevation of about 12,000 feet above sea level.

Geology.

The rocks exposed consist of devonian and silurian limestones, more or less metamorphosed, and primordial quartzites and cambrian schists, with a little porphyry and gneiss.

All of these formations show perfect evidence of having been extensively tilted and dislocated in a most complicated manner, during the repeated upheavals, which has left them greatly disturbed as regards their original horizontal position. Such a condition of things makes good mines possible. The veins were thus fractured by faults and upheavals, and in which we find the present ore bodies and mineral lodes. In the mountain chain or range, included in the Blackburn district, there are three great faults; each of these great faults may be satisfactorily observed near the end of the range, as viewed from the standpoint of Mr. Hawley's ranch, near the sink of Little Lost river. In each of the three faults there are ore veins, and the ore bodies, like the faults, are continuous for miles. The greatest of these great faults is the one on the west; this fault seems to be the "center of upheaval," as may be seen by its exposition of the deepest and oldest rocks, which are here thrown to the surface. In this fault, also, are located the chief mines of the region, viz.: "The Tyndall lode," on which are the following full-size claim extensions: Tyndall, Ingersoll, Silver Queen, Dixie, Daisy Black, Great Northern, Alice, Governor Murray, Combination and others. All of these claims show galena carbonate ores, while some show immense bodies, prominent among which may be mentioned the Ingersoll and Daisy Black.

The Ingersoll Mine.

The outcrop shows ore for 1500 feet, or the entire length. The ore consists of galena, carbonate of lead, both rich in silver; black copper with ruby and native silver. Assays range from a few ounces up to nearly 6000 ounces silver per ton, with a little gold. Ore has been shipped from the Ingersoll to Salt Lake City and to the Viola Smelter, Nicholia, and thence sampled (carload lots) in Salt Lake—"78 oz. silver, 37 per cent lead (surface ore), and later shipment to Viola sampled 107 oz. silver, 41 per cent lead, second class; and 587 oz. silver, 12 per cent lead and 15 per cent copper, first class." The ore varies in width from a few feet to 30 feet the widest, and varies in character, also, from the rich black copper to low grade (but good concentrating) sand carbonates. The vein strikes north and south, (same as the trend of the mountain range) and dips slightly east directly into the mountain. Both walls quartzite—the east or hanging-wall a very light colored, almost white quartzite, more than 95 per cent silica, while the west or footwall is a brown, ferruginous quartzite, about 75 per cent silica. This footwall or brown quartzite carries also a few ounces silver per ton. The Ingersoll mine, according to general indications, is going to prove a great bonanza—the ore being of good grade and a big showing for the amount of work or development.

The Tyndall Mine.

This claim is in exactly the same formation as the Ingersoll, and contains galena carbonate ore assaying as high as 65 per cent lead and from 50 to 250 ounces silver per ton.

The Silver Queen

Shows the same, being an adjoining extension and south of the Ingersoll.

The Dixie Mine

Is of a similar nature and adjoins the Ingersoll on the north, the Dixie ore being a coarser-grained galena than the latter, and not so rich in silver, but a first-class prospect, as there has been very little work done on the Dixie at the point where the ore comes to the surface. It is the same contact as the Ingersoll, and evidently all that is necessary to get plenty of ore is simply "a shaft" to reach it.

The Daisy Black

Has just been patented. The Daisy is an immense galena mine—ore bodies of vast extent. It is to be worked soon, and the several thousand tons of galena now in sight will be shipped to market this season. The Daisy, if properly managed, can be easily made to produce a thousand dollars' worth of ore daily, or with only 25 good miners should turn out \$30,000 a month. The mine is a bonanza to commence with. Some places the ore is 40 feet in width. It has all evidence of proving one of the big mines—ore everywhere, between walls and outside of walls; a mountain of ore! So much galena that the very ground gives off mineral fumes—"smells of mineral!" Mineral on top the ground, all through the ground, the mountain full of it, and float for a half mile down a canyon! Such is the Daisy Black.

The Great Northern and Alice

Claims show also to be a continuation of the

same ore vein; for hundreds of feet there is a galena and carbonate ore cropping out, and the lode stands up strong, wide, and of great promise in these claims. All that is needed is work to make them pay.

The Gov. Murray Mine

Is on the same great contact, and evidently only a question of depth about reaching a good ore body. It is a promising claim. Some carbonates ore shows at places and it all comes from below. Go down on it, Jake, and eventually you will "catch on!"

The Combination Mine

Is the boss "iron racket" of the camp. At 100 feet there is over 40 feet of oxidized iron. This iron looks like a mass of "burnt-up" and melted slag; porous and scoriaceous, spongy and corrugated like unto the hinges of hades. This great body of iron means something else down "thar!" It shows, too, some nice steel galena in the solid parts, and on down you will cut through the "iron cap" into lead and silver by the million!

The Sage Hen Mine

Is evidently a good lead "off the main contact;" it is just below the Daisy Black in the same mountain and evidently has a subterranean connection with the Daisy. The ore is of the same character—steel galena and gray carbonates. A shipment of two carloads from the Sage Hen was recently sent to Omaha. The ore pays a fair dividend.

The Golden Copper Mine

Is another claim off the above contact (Tyndall) and is situated in the cambrian gneiss above mentioned. It is a gold-silver-copper-lead ore, assaying \$15 gold, 60 ounces silver, 40 per cent copper, and 10 per cent lead. Iron silicious gangue; well-defined vein. There are several other good claims in this district which should be mentioned, but for the present the list is concluded. I have to say to the capitalist that, "bargains of great profit may be had in this section—mines that will pay from the very surface—and at prices seldom so low." To the prospector I have to say: "this region is not half examined to date, and it is a promising field in which to find mines, especially silver-lead mines." We have a bountiful supply of timber-wood and water. The climate, the best in Idaho, outside of Boise and Lewiston. We are 60 miles to rail, but a smooth road over a level country, across the lava-fields, Camas or Blackfoot. Freight to railroad only \$10 per ton. Mining information of a personal nature may be had of Chas. F. Blackburn, mining geologist, Howe, Idaho. Mr. Blackburn discovered the first mines on Little Lost river, owns several of the above claims and is well acquainted with the country. The mines above mentioned vary in altitude from 6000 to 7500 feet above the ocean. Very conveniently situated for economic development. Can be worked the year round. Winters usually mild. Very light snows compared with the country both east and west. Taken altogether, we have an exceedingly promising mining region hereabouts, and during the following summer considerable heavy ore will be sent out. I may conclude by saying that a good custom smelter would make lots of money by reducing our lead-silver ore to bullion right here at the mines. It would be a big paying institution. Plenty ore. No facilities lacking except railroad, and that even would not prevent good pay for the smelter.

PICK AND DRILL.

Howe, Idaho, Jan. 19, 1887.

The Starlight Mine, El Dorado County.

EDITORS PRESS:—On Saturday last we set out with a view to visiting some of the principal quartz mines in the vicinity of El Dorado; but, on arriving at the Starlight, a heavy rain began to fall and we concluded to retrace our steps, not, however, before gaining some information respecting this valuable mine. Mr. Geo. E. Black, the efficient superintendent, greeted us cordially, and very kindly furnished us with the following statistics:

The Starlight, owned and operated by the Starlight Mining Co. (Incorporated), is situated in Mud Spring township, on the summit of one of the loftiest peaks in the vicinity, and is about 3½ miles in a southerly direction from the town of El Dorado and one mile west from Log Town. The hoisting works are run by steam-power, and are a model of perfection. The boiler is of 30-horse power capacity, and is laid in cut granite, presenting a very neat and attractive appearance.

The incline, which is on an angle of 37°, is 280 feet deep, from which drifts are run as follows: On the 160-foot level, north 355 feet, and south 200 feet, and on the 270-foot level, 35 feet. The vein has a uniform thickness of about three feet, and is of high-grade ore. The company has another incline about 550 feet north from its present working shaft which is 175 feet deep, from which drifts are run as follows: On the 80-foot level, running south, 100 feet; on the 100-foot level, south, 140 feet; and on the 150-foot level, south, 110 feet. There is about 3000 tons of ore on the several dumps, which, judging from the character and appearance of the ore, must yield its owners a handsome profit. We were also shown some very fine specimens which were rich in free gold. The company contemplates the erection of a mill in the near future.

Green Valley, El Dorado Co., Jan. 17, 1887.

Portable Quartz Mills.

The Need of Small Stamp Batteries.

EDITORS PRESS:—Since you published my communication of general inquiry for the reason that stamp mill manufacturers would not make a portable outfit as well as sawmill manufacturers, I find that my inquiry was misunderstood. I did not mean merely the battery, nor of one of new and untried machines—the small operator cannot afford them, no matter what the price—but the old, reliable lifting stamp. With the stamps must be plates and concentrator, and small pans and settler. All of which can be made portable, as well as dozens of other kinds of machinery.

Given an ore, of which there is a reasonable plenty in this camp, that will assay \$25 to \$40, with sometimes pockets that will multiply those figures 10 to 100 times, but the one that I specially refer to can be relied upon for an average of \$25 per ton. But six tons per day is as much as can be reasonably expected from it without more expense than can be afforded now. Ten to fifteen dollars of that assay is silver, balance gold; the silver lays in carbonates of lead and copper, some as brittle silver in limy quartz; the gold is free and in sulphurets. The mineral comes from the mine in a mixture of quartz, clay and lumps of carbonates and galena. Now without a concentrator, and pans and settler, what are you going to do with it? It can't be shipped, for the freight to the nearest railroad station would cost \$25 per ton. You can't smelt here, because there is not galena enough as yet found in the camp. With \$40,000 a man could build a first-class mill to work it, but the mine wouldn't support such a mill without an expenditure not to be thought of now, and even then it would perhaps raise the cost of mining beyond the limits allowed by present assays.

Now rolls won't work it without drying for the clay in it, and the clay carries fine carbonates as well as free gold. If you work a heavy stamp on it, it pounds the carbonates and brittle silver too fine, and you can't stop them from going out with the tailings. If you run your stamps with a low drop, you won't do any work, only with more battery; more battery costs more money, and if the miner had more money he would quit the business.

What he wants is a small battery of five stamps, say of 450 pounds each; an automatic feeder, a small breaker, battery and apron plates, a concentrator, a couple of small pans, say 36 inch, and a settler, a well-made portable engine and small pump. But all that machinery must be made so that it stands on low foundations to save expensive framing, grades being overcome by bucket elevators. Then the small millman catches his free gold on his plates, his concentrator saves his carbonates and sulphurets, and his pans and settler a goodly percentage of his mineral that he doesn't get, nor can't get, elsewhere.

With such a mill a prospector or two could combine their capital, and their "prospects" would keep it running and running every day, and a very small crew could operate it. It would be, in fact, a bank on which they could draw for capital to open their mines. If they didn't hold out in depth, it could be easily moved to some other locality. In such an event, one would miss those huge monuments to somebody's had judgment that stud our mining camps like ghosts and give had names to good districts.

But write to our best manufacturers, those who have a reputation in their machinery, and they will reply, "We have no patterns for such a mill, but should you desire," etc.; which means when you are rich enough to quit mining come to us and we will sell you a mill that seven times out of ten will be too big for your mine and put you where you will have to commence over again. Now, the road is a long and hard one; what we want is a mill that will make it less "rocky," and not compel us to fly to that refuge, an "Eastern syndicate," which only means a nest of swindlers, pirates and magnified dead beats.

Surely such a little mill can be built, but who will do it?

EUGENE SMITH.

Fort Maginnis, Montana.

Mountain House District, Montana.

EDITORS PRESS:—Noticing a request in the PRESS for items in regard to mining camps, I send you a few brief notes about this and others in the vicinity. This Mountain House district, 15 miles from Thompson, on the road to the Cœur d'Alene mines, was discovered two years ago. The first mines located were found to be antimony, a large amount of the ore in some of the mines being a very pure sulphide of antimony. The antimony mines have been developed but little. The past summer, a Minneapolis company has been erecting a smelter to work those ores, but through mismanagement has not started up, though they expect to next spring. The mines could probably be bought reasonably.

The next discovery was a galena ledge, the Lucky Boh. A shaft was sunk 60 feet and crosscut run which was 14 feet in galena ore. A tunnel started at foot of the hill to drain the shaft 60 feet deeper is in 110 feet, and crosscuts being run both ways, are in now 12 feet each side, of tunnel, and some galena is

found the whole width, with considerable white quartz, in a slate formation.

This fall a new discovery has been made which promises well. It is white quartz, carrying chloride of silver and gold. On the surface it assays as high as 37 ounces silver and \$18 gold per ton. No development as yet; about three feet crevice.

The camp on the south fork of the Cœur d'Alene river, known as the Hunter district, in which is located the town of Mullen, was started two years ago last spring. This Hunter mine was the first located. Then the Evening and Morning, and the Just What and You Like; after which, hundreds of others. The Hunter has been bonded over a year, and last month was sold for \$90,000. The Evening is now under bond for \$45,000, and work is being vigorously prosecuted; the Morning is bonded for \$12,000. These leads are all galena, carrying some high-grade ore, as gray copper and brittle silver. The Just What and You Like have rich chloride ores running from \$200 to \$800 per ton silver, and probably will develop galena, as they are in the belt. There is already considerable inquiry about them. The prospectors in that region are very much excited, and without doubt, next summer, will see a big boom in that district similar to the one the past year in Wardner.

W. J. CLARK.

Mountain House, Thompson Falls, M. T.

Alhambra Mining Camp.

EDITORS PRESS:—Some of the great problems in this particular mineral portion of California are being solved. For 3750 feet along the line of croppings on this belt, from north to south, there is gold. The deepest point so far reached on the vein is 64½ feet, where the ore is charged with free gold, iron, galena and ruby sulphurets. The vein widens from surface from 2 to 6 feet at a depth of 64½ feet on the vein in solid quartz. The walls are slate. This pay chute has been crossed at intervals for a distance of 3750 feet; its dip is to the eastward. This chute of ore is a wonderful discovery and prospects all along its line, never giving out. It is, of course, richer in some places than others. At the south end and middle of the explored part it is immensely rich. On the Alhambra and Atlanta mines, which run parallel, and from every indication extend through the entire mining district, are large, bold croppings, in one place over 100 feet wide. The Atlanta and Alhambra mines have produced bullion in all (to the original owners) \$507,000. This may be considered the greatest chute of free gold ever discovered in El Dorado county. The present anxiety of the original locators to see 100 feet deeper on this chute of ore can better be imagined than described.

The middle mine (the Alhambra) is equipped with a plant of a new five-stamp mill, etc., and is making a profitable showing. It has produced over \$30,000 free gold. The sulphurets contained in the quartz are not saved. On the south of Alhambra mine is the Atlanta G. and S. M. Co., better known as the Big Blue ledge. In the years of 1866-7 upward of \$488,000 was taken out of shafts Nos. 1, 2, 3, 4 and 5, at a depth of 30 to 40 feet, and from drift running south 200 feet and drift running north 40 feet from No. 5 shaft.

The Alhambra mine was located in 1883, the middle location on the pay chute. A shaft was sunk 29 feet. A block of ground 23 feet in width was mined out. The ore was milled and assayed, and the richest quartz shipped to Professor Price, of San Francisco, which yielded—the block of ground—\$27,600. From September to December, 1886, new parties commenced operations by sinking one of the old shafts down to 64½ feet and have struck rich ore six feet in width, the richest part of the vein lying next to the hanging-wall, and the gold spattered in the slatewall.

This portion of the ledge assays high. The average of the entire body of ore has not yet been determined. There are some 60 tons of quartz on the dump. The present owner is at a loss to know how to treat this particular ore, as sulphurets predominate.

The latest improvements and facilities for saving the most profitable part of the vein are not on the property. This new find is a "paralyzer" to the new party. All the mines are covered with pines, said to be the finest belt of timber land in El Dorado county.

Recently the people of Placerville have made a request to the Southern Pacific Company to extend its line from Shingle Springs to their town. Negotiations are now in progress for the construction of the line. This new camp is situated 8½ miles northeast of Placerville, 4½ miles south of Georgetown, 1½ miles east of the Gopher mine, purchased recently by an English syndicate, and which is being worked on a large scale. It is 2 miles northeast of the Saint Lawrence mine, 2½ miles northeast of Kelsey diggings, originally discovered and owned by J. W. Marshall. It is 7½ miles northeast of the Church Union mine. This shows conclusively that it is the same continuous rich belt of mineral.

James Wilson Marshall, the discoverer of gold in California, was one of the discoverers of this gold belt in the year 1866, and it was wrongly wrested from him by a corporation, assessing him on his stock to the tune of \$20 per share. The story is that these quartz mines are some of the rich finds disclosed by Mr. Marshall to a

lot of sharpers in the early days of the quartz boom in El Dorado county.

The company incorporated on the Big Blue ledge, now known as the Atlanta, and floated the stock at \$10 and \$20 per share. Then the mine was abandoned by the manipulators. This group of mines lies the farthest east on the belt in El Dorado county. The first mine to commence operations has been self-supporting, and paid the cost of mill, etc., and over \$20,000 in profits to discoverers. With the prospect of a railroad passing in sight of mines in the near future, this new camp should have some consideration.

Kelsey District, El Dorado Co., Cal.

Theory of Earthquakes.

EDITORS PRESS:—I concluded a former article in review of Major Powell's essay on the theory of earthquakes, showing by a conclusive argument that if his theory of the cause of earthquakes were correct there could not by any possibility ever be any volcanoes. I now propose to show that his theory concerning the structural condition of the earth is contradictory and fallacious. To make this clearly appear, it is necessary for me to quote verbatim a section of his essay, as follows: "It is a well-known fact that cooling is a shrinking process. The earth is therefore shrinking, by reason of the great cooling which it is undergoing. The interior of the earth globe does not cool at the same rate as the exterior. The temperature at the surface of the earth remains practically constant, being regulated and controlled by the heat received from the sun, by the heat radiated into space and by the conservative influence of the atmosphere. The influence of this control is not confined to the surface, but extends downward with gradual diminution, and the exterior shell is thus prevented from cooling and contracting at the same rate as the interior. As the interior diminishes in volume it shrinks away from the exterior shell, which must then support itself as a hollow sphere if it continues to retain its size. This it cannot do, as the strength of the materials of which it is composed is insufficient to resist the enormous gravity of its own rocks. The shell by its own weight is forced to yield. In this manner displacement originates. The weight of the crust breaks it down, so the interior heated mass contracts with cooling." In the foregoing passage Major Powell begins with a misstatement. It is not a universal fact that "cooling is a shrinking process," as, for instance, water is considerably enlarged in volume when cooled to a degree sufficient to form ice. In order to hold the ground of his reasoning he must specify when, and how cause why, there occurred such change as to make the interior of the earth cool faster than the surface; for by his theory there should at some time have been such change. Otherwise the condensation by cooling would have begun in the interior, and proceeded thence to the surface, leaving it the last portion to become solidified. In another place he says: "Faults are very common in geologic formations. Sometimes a district of country is broken into irregular blocks by them." The area of such a block may be 1 square mile, 10 square miles, 100 square miles, 1000 square miles, or 10,000 square miles.

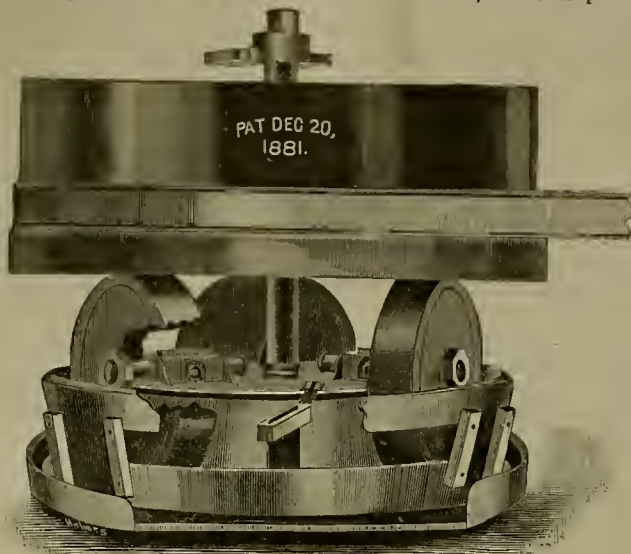
He gives an instance. He says: "The Sierra Nevada is a great block, 50 to 70 miles in width, and more than 500 miles in length, which relatively to the adjacent country on every hand has been uplifted." On the eastern side it has been uplifted from 12,000 to 20,000 feet for a distance of more than 500 miles. Along the line of uplift the rocks have been severed from the adjacent rocks on the east by faulting and by flexure." Major Powell assumes in his theory that a constant vacuum, or, at least, a constant vacuous tendency, exists between the soft interior and solid shell of the earth. Under such conditions there could not occur an uplifting of any portion of the shell except such as might result from a cramping process. It is utterly impossible of conception how a rocky sheet or plate (for such it must be regarded, as he limits the thickness of the earth's crust to about 20 miles) of such size as the Sierra should become entirely severed from the surrounding portions of the crust, and be bodily uplifted by a contractile elevation produced in that manner must of necessity appear in a pyramidal or ridged form. Every known fact of natural science tends to corroborate the idea that the main body of the earth, from center to circumference, is, at this time, composed of solid substance. The primary cause of earthquakes must ever remain a speculative question, impossible of positive solution; and the existing configuration of the earth's surface has been produced mainly by the action of wind and water during the occurrence of a universal deluge; changed and modified somewhat by the action of the same forces during and since the recession of the waters. All the visible effects of convulsive or disruptive action are, comparatively, insignificant.

JUSTIN CHENOWETH.

SOME enthusiastic but ignorant prospectors have been jumping patented mines up in Montana. That is no worse, however, than has been done in California, where people have "relocated" hoisting works and mills on mines they thought had neglected assessment work.

Lower Springs Mining District.

EDITORS PRESS:—Since capital has taken hold of the mines here, more particularly the Muchmore mine, considerable excitement prevails. Every miner that has a ledge or claim within 10 miles of the Gem, of course has the continuation of the Gem lode. Parties left here last summer disgusted with the camp, but since capital has taken hold of the Muchmore property, they imagine all ledges are equal to the Gem! But such is not the case, as there are but few good ledges in any mining belt. The Gem is supposed to be the true fissure vein of this country. Some mine-holders here are valuing their property too high. In some there is very little in sight to indicate a mine, and



GUTENBERGER'S ROLLER ORE CRUSHER AND GRINDER.

they never will have a mine; but others have splendid prospects.

The Eureka Mine

Being the west extension of the Gem, is advancing its tunnel rapidly toward the old shaft which was sunk many years ago. Some very fine ore has been taken out in the tunnel which runs along on the ledge. The company has about 150 feet to run yet before getting directly under the shaft. Here at this particular place they expect to find still better ore than yet encountered—a pay chute that will be second to the Gem. Every indication is favorable for this. There is little doubt that this will make a mine. The hanging-wall is porphyry, and footwall more of a serpentine rock. Plenty of clay on each wall.

The Little Winnie Mine

Is located on the west end of the Eureka. It is supposed to be the same ledge as the Eureka and the Gem. The Gem lode can be traced distinctly for over two miles in an easterly and westerly direction. This Winnie mine produces some very fine ore, and promises to be of considerable importance. This lode has a direct course to the town of Shasta, and may be found still further on.

The White Oak and Eastern Star

Are showing good prospects. These mines will be valuable some of these days, as they prospect well in so many different places. The ledge are strong and in the same belt as the Gem lode.

J. C. F.

Lower Springs, Shasta Co., Cal., Jan. 16, 1887.

Timbering Stopes With Square Sets.

EDITORS PRESS:—Until recently the general public, and also the writer of this, supposed that Mr. Philip Deidesheimer was the originator or inventor of timbering stopes in mines with "square sets." I am not aware that Mr. Deidesheimer ever disclaimed the credit given him surreptitiously, and it is but justice to place the credit where it actually belongs.

In the fall of 1861, Messrs. Thomee Reeder and A. E. Smith, then working in the carpenter department of the Ophir mine, originated and perfected the system now in vogue. Mr. Deidesheimer was manager, and Captain Wm. Dall mine and mill superintendent of the Ophir at the time.

F. STETCHEL.

San Francisco, Jan. 14, 1887.

MEXICAN MINES.—From the year 1537 to 1821, while Mexico was a Spanish colony, the total value of her gold, silver and copper coinage was \$2,151,581,960. During her independence, say 1822 to 1872, \$809,655,921. From 1872 to June 30th last, \$326,639,693, or a total coinage since her mints were established of \$3,287,876,904, all produced in that country. These exhibits of production and mintage indicate a steady development of the mining interests of the United States of America, and also of Mexico, and with the increasing facilities of railway communication fostering every department of industry, the outlook for a continued growth in the product of precious metals is flattering.

Gutenberg's Roller Ore-Crusher.

We give on this page an illustration of Gutenberg's roller ore-crusher and grinder, several of which are now in operation in this State. Upon a suitable base is a pan having near its edge a deep annular groove, the inner wall of which is vertical and the outer wall inclined from below outward.

A central vertical shaft has its lower bearing at the center of the circles described by the concentric walls of the groove, and its upper bearing at the intersection of crosshairs or frames. Upon this shaft is placed a loose hub having radially projecting arms, upon the ends of which are spindles on which the crushing or grinding rollers turn. These rollers are of the same diameter, and their perimeters are

tally arranged driving pulley, acting upon the crushing rollers by frictional contact to cause them to turn on their spindles and revolve around the shaft. This driving pulley is keyed on the shaft by a spline or feather, and readily rises when the rollers pass over a lump of ore which they are incapable of crushing. It is provided on its upper side with an annular vertical flange, concentric with the master wheel and separated therefrom by an annular collar which holds the endless belt actuating said wheel off therefrom.

It will be observed that as the driving or master wheel rests solely upon the crushing and grinding wheels, the effect of the latter upon ore is greatly increased, and the efficiency of the machine correspondingly increased. Should the crushing power in working certain very hard ores prove inefficient, owing to a deficiency of the weight of the machine, this defect may be remedied by loading down the master wheel within the pulley flange, when there will be no interference from the belt.

In these machines the crushing wheels end driving wheel may be of various weights according to circumstances. By means of the weight receptacle the pressure on the rollers can be varied. The inventor, Wm. Gutenberg, is proprietor of the Sacramento foundry and machine shop, and his address will be found in our advertising column.

FIRST FINDING GOLD.—The story is going the rounds that Mrs. John Murphy, of San Jose, has been telling a reporter that gold was first found in California at Donner lake in 1846-47. Mrs. Murphy was one of a party snowed in at Donner lake that winter, and she says that John Denton, a gunsmith who was there, saw something shining in some rocks which had been used to build a fire upon, and Denton broke off the shining stuff and said it was gold, and he put it in a purse and put it in his pocket. Denton died and the gold was buried with him. This is a brief relation of a very long story. We think Mr. Denton did not find gold in any of the rocks at Donner lake, but that he saw some micaeone substance and pocketed it. The rocks around Donner lake, which were used for fire supports by the Donner party, are as bare of gold as the pocket this minute of the scribbler who scribbles this and who wonders while he scribbles why people will allow their imagination to run away with them on the gold-finding question. Marshall, at Coloma, El Dorado county, first found gold in California. The monument the Native Sons of the Golden West are going to erect to his memory will say so, and monuments always tell the truth.—*Foothill Tidings*.

Utah's Metal Product for 1886.

Wells, Fargo & Co.'s Statement of the Mineral Product of Utah for 1886.

BASE BULLION.	Lbs. Copper.	Lbs. Lead Refined.	Lbs. Lead Unrefined.	Ozs. Fine Silver.	Ozs. Fine Gold.
Germania Lead Works.....		208,800	9,834,700	668,106	1,853
Hannan Smelter.....			11,741,768	908,302	2,374
Mingo Furnace Co.....			11,743,749	380,440	1,640
Other Smelters.....			523,631	23,845	55
Net Product Base Bullion.....		208,800	33,843,843	1,970,692	5,922
Contents Ore Shipped.....			13,024,852	649,878	1,921
Contents Ore and Matte Shipped.....	2,407,550		1,587,565	217,692	526
Total.....	2,407,550	208,800	48,466,200	2,838,263	8,369

DORE BARS.

Daly Silver Mining Co.....				801,712	639
Ontario Silver Mining Co.....				1,859,667	981
Silver Reef District.....				303,634	.....
Other Mills and Places.....				25,600	588
Total Dore Bars.....				8,080,579	2,208

RECAPITULATION.

2,407,550 lbs. Copper, at 6 cents per lb.....	\$ 144,453.00
208,800 lbs. Refined Lead, at 4 1/2-100 cents per lb.....	9,067.44
48,466,200 lbs. Unrefined Lead at \$38 per ton.....	1,405,231.54
5,919,842 ozs. Fine Silver at \$20.00 per oz.....	5,800,837.34
10,577 ozs. Fine Gold at \$20 per oz.....	211,540.00

Total Export Value.....\$7,631,729.32

Computing the Gold and Silver at its mint valuation and other metals at their value at the seaboard, it would increase the value of the product to \$10,365,044.67.

Comparative Statement, showing the quantity of the Silver and Gold contained in base bullion produced in Utah:

YEAR.	Total Ounces of Silver Produced.	Total Ounces of Gold Produced.	Ounces of Silver in Ores and Base Bullion.	Ounces of Gold in Ores and Base Bullion.	Pcr Cent of Total Silver Product.	Pcr Cent of Total Gold Product.
1877	4,359,703	17,325	2,102,098	11,035	48.2-10	63.6-10
1878	4,357,328	15,040	2,108,339	10,165	48.3-10	67.5-10
1879	3,835,047	15,932	1,797,589	5,693	46.8-10	35.7-10
1880	3,783,506	8,020	1,403,819	2,878	37.1-10	35.8-10
1881	5,400,111	7,958	2,643,896	2,622	48.9-10	32.9-10
1882	5,435,444	9,039	2,581,789	5,016	47.3-10	55.5-10
1883	4,581,768	6,991	2,351,190	5,597	51.8-10	80.
1884	5,660,488	5,530	3,253,084	3,806	57.4-10	68.8-10
1885	5,072,689	8,003	8,180,576	7,289	53.4-10	81.3-10
1886	5,918,842	10,577	2,888,263	8,369	47.0-10	79.1-10

Comparative Statement of the value of lead bullion, including silver and gold necessarily produced in its manufacture west of the Missouri River, compiled from the annual reports issued by John J. Valentine, Vice-President and General Manager, Wells, Fargo & Co., San Francisco.

YEAR.	Total Value of Precious Metals, including Lead.	Total Value of Lead Bullion, including Gold and Silver Contents.	Pcr Cent of Entire Product.
1878	\$81,154,623	\$14,740,581	18.1-10
1879	75,340,501	10,234,394	13.5-10
1880	80,167,936	28,114,564	35.
1881	84,504,417	30,255,430	35.8-10
1882	92,411,835	35,798,750	38.7-10
1883	90,313,612	34,810,022	38.5-10
1884	81,476,954	31,191,250	38.7-10
1885	90,151,200	35,731,711	39.6-10

The above statement shows a marked annual increase in the percentage of precious metals produced in the manufacture of base bullion. It demonstrates conclusively that the process of smelting is in the ascendant for the reduction of ores, and that any causes tending to decrease or discourage the production of lead will produce a corresponding decrease in the gold and silver production west of the Missouri River.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

WILDMAN.—*Ledger*, Jan. 22: The resumption of work on this mine is expected, and not without good reasons, to restore the town of Sutter Creek to its old-time prosperity. It has been idle for about 20 years. A shaft was sunk 500 feet and two drifts run north and south about 50 feet, disclosing a ledge of fair dimensions, which paid all the way from \$3 to \$18 per ton in free gold. The rock was worked in a 10-stamp mill, and the fact that it was closed down as unprofitable is no argument that it would not be a first-class paying property with the improved gold-saving apparatus of the present time. If the ore averages \$6 per ton, and it certainly ought to do better than that including sulphurets, it can be made to pay. John Tregloan, Sen., who is a first-class miner, and who in fact was the original locator of the South Spring Hill—one of the best mines in the State—about six months in the East, succeeded in disposing of the mine to heavy capitalists in Boston, who are starting in to work it on a scale that promises success. A large portion of the lumber for the hoisting works is already on the ground. Knight & Co. are making a hydraulic pump—one of Knight's invention—for this mine. There is one of these pumps in operation at the Plumas Eureka mine in Plumas county—one of the biggest mines in the State—and it has been found economical and satisfactory in every respect. The pump for the Wildman is to be 10 inches in diameter, and is calculated to discharge 200 gallons per minute, equal to a steady stream of 17 miners' inches. It will take about two months to get it in working order. We understand that it was the heavy flow of water, and the difficulty encountered in controlling it, that was the principal cause of the mine being abandoned in former days. There is no doubt that the water can easily be controlled now, and we expect that in the course of a year the Wildman will take its place among the permanent and paying mines of Amador county.

MISCELLANEOUS.—At the big tunnel at Middle Bar, another body of rich metal was encountered a few days ago, in extending the tunnel northward. The extent of the strike we have been unable to ascertain. Geo. Durban has been placed in charge of the works during Mr. Nevill's absence. Some fine specimens of black metal, containing a large percentage of gold, were taken from the Valparaiso ground last week. This mine joins the Mammoth at Middle Bar on the north.

Calaveras.

GLENCOE.—*Calaveras Chronicle*, Jan. 22: Mining, the foundation of our sustenance, has a healthy appearance, with every prospect of improving as the season opens. The Banner mine, under the management of J. T. Davis, has been placed in good working order, there being an eight-inch Cornish lift pump at present in operation, taking out the water. As soon as the water is out, the parties intend putting on a force of 30 men taking out rock. A mill for grinding will be placed in the gulch adjoining the mine. Jones & Co. have erected substantial hoisting machinery on the Conrad mine, and intend to commence about the 25th inst. to take out rock, having at present a vein over four feet in width in the shaft that will mill \$25 per ton. T. J. Posey has a full force of men to work preparing for a 10-stamp mill which is en route from San Francisco for his mine. Thos. Woodcock has had a force of men for the past month extracting ore from the Stonewall Jackson, which shows up finely for the amount of development. A splendid arastra mill has been erected on Wet Gulch by Maston & Son, which is kept busy and is even unable to do the work of its patrons. It has been a long-felt want and is appreciated by the mining fraternity. Reed & Co., of Mokelumne Hill, have had some rock tested from the McNoble Brothers' mines which prospect upward of \$40 per ton, mill process in San Francisco.

GOOD RUN.—*Calaveras Prospect*, Jan. 22: The first 26 days' run of the new mill just completed in this vicinity by the Union Gold Co. resulted in a cleanup of \$9132.79 with 30 stamps. A sample of the rock taken from the two-foot vein tapped at the 200-foot level, assayed in San Francisco the first of the week, showed \$602 per ton result.

El Dorado.

A NEW MILL.—*El Dorado Republican*, Jan. 20: E. Ball was in town last Saturday, from the El Dorado mine, adjoining the Church-Union, on which he will superintend the construction of a ten-stamp mill that is to be immediately put up. The owners—ex-Governor Perkins, W. H. Brown and Jacob Neff, of Placer county—are men of means, and they will have the capital to develop the mine if the prospects continue to be encouraging. The adjoining Church-Union has now a very large body of paying ore in the 1400-foot level, so that the theory that mines on the great mineral belt will be as good in this county as in Amador, when a sufficient depth is reached, may be perfectly correct.

AN OLD CLAIM.—*Georgetown Gazette*, Jan. 22: H. A. Wagner is still working his mine between Dry Creek and Bear creek. He has been working the claim since 1872, and has now made application for a patent. If all our miners who are holding mining ground, and desire to have the mineral land held for the use of the miners, would persist in working their claims, as does Mr. Wagner and others we could mention, there would be more paying mines discovered and more mineral patents applied for, which would do much toward deciding the controversy between the miners and R. R. Company.

Fresno.

QUARTZ.—*Foothill Tidings*, Jan. 22: Mr. James Bennallack, well and favorably known as a mining expert, during his recent absence from town, visited some quartz mines in Fresno county, acting in the interests of London capitalists. The gentleman has brought to town some specimens of ore taken from one of the mines visited, and exhibited the same to the reporter. The ore presents a lively appearance, shows gold freely, and would be taken as coming from one of our local mines. Mr. Bennallack asserted that the general characteristics of the quartz

vein from which the samples were taken more closely resembled that of the Grass Valley district than any he has ever seen.

KING'S RIVER.—*Cor. Fresno Examiner*, Jan. 22: I had occasion to visit a part of the mines on the north side of King's river—that is to say, Big and Sycamore creeks. On Sycamore creek there are several persons actively engaged in placer mining along the creek. Among the most noted claims is one owned by Ed. Rape and George Shannon. They are diligently "ground-sluicing," and are making considerable money. They are also the owners of the Black Cut quartz mine, which is five feet wide and prospects well in flour gold and sulphurets, and lies in talc formation. The Trove lode, owned by Rape & Slocum Brothers, prospects well in fine gold. A shaft sunk 25 feet shows a well-defined ledge four feet wide. On Big creek I visited the Jack Watts mine, now owned by Dr. Barnes. He has a one-stamp mill running on very rich quartz. Recently a strike was made in this mine of fabulous richness, and its extent is unknown. It is thought by those who pretend to know that the "pocket" is worth at least \$50,000. There are several other good mines in this locality, and before another year has elapsed it will be one of the best districts in the State on account of its great facilities for water-power. The best of timber is abundant, and nothing is wanting except a small amount of capital.

Nevada.

LATE DOINGS IN MINING CIRCLES.—*Foothill Tidings*, Jan. 22: The Grass Valley air is thick with mining talk. Rumors of mines sold, to be sold, bonded, leased, being examined by capitalists, and so on, are prevalent everywhere. It is a fact, however, that there is great activity in Grass Valley mining circles. Many capitalists or their agents are in and around town, and much quiet business is transpiring. In the near future we hope to announce facts, in the way of mining enterprises, that will convince our people that all the rumors afloat are not without foundation, and that the palmy days of this district are yet to come. The Gold Leaf mine, situated near the North Star and adjoining the latter on the south, has been bonded by San Francisco parties in the sum of \$10,000. The parties bonding the Gold Leaf have agreed to place machinery on the mine and to do a certain stated amount of work, and the work will commence immediately. This claim is owned by B. Johnson, S. H. Dille, Jos. Griffiths, Charles Whiting and Robert Kemp. Although situated in a favorite mining locality, but little work has been done on the claim, only prospect shafts having been sunk, the deepest of which is but 40 feet. From these shafts rock ranging from \$30 to \$100 per load has been taken. A crushing, recently completed, of 24 loads of rock from the Slate ledge, or Perrin mine, yielded \$34 per load. Francis & Co. are the lessees of this mine. The new 30-stamp mill being erected for the North Star Mining Co. is nearing completion. If nothing unforeseen happens the mill will be pounding out gold by the middle of February, or, at the latest, the first of March. About 100 tons of ore is now on the dump and large quantities being taken out daily. When completed, the North Star Co. can boast of the finest quartz mill in the State, if not in the world. The Metropolitan mine, situated near Moore's flat, has a ledge which is from four to six feet thick and pays \$5 per ton, and the ore can be extracted and crushed for \$2 a ton. The ledge is worked through tunnels, and is strongly developed, having been prospected for a distance of 2900 feet. The Metropolitan has been worked so as to give from 2000 to 3000 feet of backs. The mine could not be better located as regards water-power for running a mill, but the owners have not the capital to erect one. John G. Jones, a well-known prospector, was in town last night, and he told several of our citizens that he has sold his Diamond quartz ledge, adjoining Leaman's vineyard, to New York men for the sum of \$50,000. It is said that the French Co. who are negotiating for the Pennsylvania mine, and who have a deed in escrow for the same, hold a similar deed for the Boston mine, situated on Wolf Creek. The Boston is regarded as a good prospect. The lessees of the Horseshoe mine are sending out some good rock.

THE IXL MINE OF WASHINGTON.—*Nevada Transcript*, Jan. 21: Work is progressing favorably at Geo. J. Binder's IXL mine on Poorman's creek, 24 miles northeast of this city, and 6 miles from the town of Washington. A mill will be erected in the spring, and in the meantime the preparations for the systematic working of the ledge are going on. This claim has quite a history. It was worked 15 years ago with an arastra. After a good cleanup one of the partners took the bullion and went to town to convert it into coin and pay what bills were owing. Instead of attending to business, he had "a run with the boys," and squandered the money. After the next cleanup, the other partner said he would show partner No. 1 how to do up business in shape, but he, too, fell into the hands of the Philistines. Trouble with creditors resulted in the mine being shut down. A tunnel had been run in 75 feet showing a ledge 15 feet thick and giving 852 feet of backs. Recently 10 tons of ore were worked at the California mill. The result was five per cent of sulphurets worth \$2.50 per ton, and \$4 a ton in free gold. It is estimated the ore will mill \$14 a ton, including sulphurets, and that there are 600,000 tons of such ore in the claim. Mr. Binder, who came out last May from Rochester, New York, is obtaining a patent to the ground. He has ample capital to properly develop its riches.

ALLISON RANCH MINE.—*Grass Valley Union*, Jan. 20: Advice just received from London leave but little doubt that the Allison Ranch mine of this district will soon pass into the hands of a company that is being organized in that city. The purchase-money for the property has been guaranteed, and it is believed that sufficient of the stock will soon be placed to raise an ample working fund. The parties in interest are not the same who were negotiating in France last season to organize a company to take the same property. The Allison Ranch mine is highly regarded by mining men who are familiar with its history. During the days of its successful operation, it produced in gold bullion over \$3,200,000, and was not worked below 500 feet on the incline of the vein, and work was stopped because of reduced product and the inability of the machinery for deep working. At that time miners were of the opinion that the riches of the quartz veins of the district were confined principally to superficial depths, 300 or 400 feet, and that deep working would not

pay. Later experience has proven the fallacy of this theory, as shown in the case of the Idaho, which is worked 2200 feet on the incline, and the Empire and North Star, respectively 1500 and 1600 feet, all of which have found rich and profitable quartz at that depth. There is every reason to believe that the Allison Ranch mine yet contains a great store of wealth, as there is a large extent of ground that has not yet been opened, and the last working of the mine left good pay ore in sight.

RICH QUARTZ BOULDER.—*Nevada Transcript*, Jan. 20: It has always been the opinion of well-informed miners that there are many valuable quartz ledges in and around North Bloomfield. While but little prospecting has been done for quartz, yet a number of ledges have been seen in the gravel mines of that section, and in fact no notice has been taken of them, it being considered that the gravel would pay better than the quartz. Every once and awhile a valuable piece of quartz rock has been found in the gravel claims, all going to show that there must be rich ledges there. Only a few days ago a beautiful quartz specimen was found in the Derbec drift gravel mine. It was almost round, measured about four inches in diameter, and was literally covered with gold. The weight of it was six pounds and one ounce, and according to the assayer's returns it contains 33.03 ounces of gold, 90 fine, making it worth, in 20-dollar pieces, \$707.53. A great many smaller specimens have been found there, but this is the largest one. The mine generally is looking splendidly, and bids fair to continue paying dividends for years to come. It would not be surprising to hear at any time of an immense strike of richer gravel than any yet encountered, as they are now working in a place where rich deposits are usually found.

NORTH STAR.—The rainy weather is interfering with the laying of the North Star water-pipe line, and appearances are now that the mill will be finished before the water is ready to be turned on.

Placer.

A MINING PURCHASE.—*Placer Herald*, Jan. 22: We learn from Mr. Benj. Hawkins, of Ophir, who was in Auburn last Wednesday, that Charlie Reed and a company of Grass Valleyans have purchased the St. Patrick quartz mill and the old Spanish lead, near the mill, and will run these properties in connection with the St. Lawrence mine, heretofore owned by Reed. They are opening up the old Spanish lead, working eight-hour shifts, and are developing some pretty good ore. The St. Patrick mill is one of the best in this part of the country, and the two mines will probably furnish ore enough to keep its 10 stamps pretty busy.

FOREST HILL.—*Herald*, Jan. 22: The Mountain Tunnel closed last week, as the men refused to work until they received their back pay. Some of the stockholders came up from San Francisco last Sunday afternoon to examine the work. It is thought that their demands will be granted and work will soon be resumed.

EXCELSIOR.—*Placer Argus*, Jan. 22: Work has been suspended in the Excelsior shaft owing to the amount of water in the mine, and the machinery has been removed. It is probable that a tunnel will have to be run to drain the mine before operations can be resumed. As the mine has been promising extremely well and the owner, Mr. Chas. Harley, is wealthy and moreover has every reason to be well satisfied with his prospects, there can hardly be any doubt of the work being undertaken ere long. The Live Oak is doing finely, the mill being kept running as constantly as the limited supply of water will permit. About 20 men are employed there. The May Flower tunnel is progressing satisfactorily. The shaft will be completed this week, after which, work on the tunnel will be done from three faces. It will take six or seven months more to complete the work.

Plumas.

TUNNEL.—*Greenville Bulletin*, Jan. 20: The Plumas Con. Mill & Mining Co. will soon begin running a tunnel to tap what is known as the Magna Charta chimney. The large "air compressor" now in position will enable the company to make rapid progress. This is one of the finest pieces of machinery of the kind ever brought to Plumas.

San Bernardino.

PROVIDENCE MINES.—*Calico Print*, Jan. 23: Some time ago D. Bahten & Co., of your town, agreed with Kerr & Patton to put a five-stamp mill on their mine at this place. The Perseverance group almost joins the Bonanza King mines on the north. The mill has been erected under the supervision of Godfrey Bahten, and is now in complete running order. A run of four days was made, and from the first stroke of the engine it was clear that everything was in place. The mine is full of ore in the various stopes, and only awaits hoisting works to get it out cheaply. The ore bodies are large and the ground easily worked, so that it only requires a few men to keep the mill running. It is rumored that the Bahtens have already sold the property to an English company for a good figure and that the new company intends adding largely to the reduction works. The ore shipped to Kingman from the new find on the west side of Providence mountain, called the Grey Hound group, made a good showing, yielding nearly 100 ounces to the ton. The owners have struck a body of water at the depth of 40 feet. The Bonanza Company so far does not appear to be making any move in the direction of putting up new works, although their property never had more ore in sight. The owners are all rich men and they are likely waiting until silver becomes a fixed standard.

MESCAL MINING DISTRICT.—The Cambria Mining and Milling Co. has already shipped 13 bars of bullion, making about 15,000 ounces from the work of their five-stamp mill. The ore is a hard quartz, and Mr. Carr, the superintendent, has just made arrangements with the Baker works of Los Angeles to put in five stamps more, which will double the bullion output. They made a large, rich strike lately in the lower levels and only require a few men to keep their mill running to their full capacity. It is rumored that the old Ivanpah works have been sold to Messrs Carr & Hodgins, and that they will shortly start up the works. Ivanpah has always paid its way, never having had any capital invested.

NEW YORK DISTRICT comes once more to the front. It is understood that parties with means have offered to put in some reduction works for an interest in the mines, and that at an early day we

will hear from New York in the way of bullion, there being a large quantity of ore on the dumps. Messrs. McBride & Miller deserve success after so many years of hard labor.

THE GOLD MINES of Arrow Mining district are again attracting some attention. Some few men are at work, the last assays from the Golden Queen at the depth of 40 feet going up into the hundreds. The La Præta is down 60 feet, showing a fine vein. This is a property that capital could soon have returns from.

Shasta.

BONANZA.—*Courier*, Jan. 14: The Old Diggings mining district is Bonanza. In early times of gold mining the surface diggings there paid immensely, from grassroots to bedrock. Years after the placers were worked out, quartz ledges were discovered containing gold, but they were only worked on the decomposed surface. Tom Harrison and a few more standbys got the "quartz fever" during the Copper City excitement, and while some fell away, Tom stuck to the true business, and to-day has a fortune in his grasp in the shape of the "Old Spanish claim" at Old Diggings. The ledge shows four feet in width, and the rock is so rich in both free and sulphureted gold that it hangs together as though woven and interlaced with copper wire. This ore is too rich to be trusted to treatment in any mill in this county, and will be sent to San Francisco for manipulation before being run into \$20 pieces at the mint. The Big Central, owned by Hopping, Bell, Garrecht, Young, Panther and Hearst, is an immense ledge carrying free and sulphureted gold in quantities that send the ore booming up into thousands of dollars per ton. The mine is named the Big Central for the reason that it is the center of a group of mines all of which are rich and "bonanza." There are other great ledges in the Old Diggings, in fact a network of them, the gold yield of which shows that the district is entitled to the cognomen of Bonanza district.

Santa Clara.

OIL DEVELOPMENT.—*New Alma Cor. San Jose Herald*, Jan. 22: Mr. R. C. McPherson shows that he means business in going ahead boring new wells for oil in the vicinity of the old ones on Mr. Moody's land; one well is already down 400 or 500 feet, and another one about ready to begin boring. Mr. McPherson is confident that there is plenty of oil in the mountains, but of course it is expensive feeling around, as every step costs thousands of dollars. Some years ago the former oil company sunk a big sum of money hunting for oil east of the Moody gulch, toward the tunnel of the S. P. R. R., on account of the big amount of gas which gathered in the tunnel while excavating it, and it will be remembered, killed 40 Chinamen in exploding; but they did not find a drop of oil for all their outlay. Mr. McPherson, should he be successful, is therefore likely to follow Horace Greeley's advice and go West, and is doing so. If he still adheres to his old imaginary line taken from the tunnel to the old wells, he will cross the Logan, Hebart, Rankin, Koppitz and Kenowden properties. On the Koppitz land is located the old Gould well, bored some 20 years ago to a depth of 300 feet, and then abandoned for lack of funds. That well is "gassing" yet, it is said.

NEVADA.

Washoe District.

SAVAGE.—*Virginia Enterprise*, Jan. 22: Hoisting ore from the 500 and 600 levels, and have about 350 tons on the surface. On the 800 level the swelling character of the ground has necessitated the re-tiling of the several drifts and easing many of the timbers. The machinery at the old shaft is in successful operation and works well, the cages running through the shaft to the 600 level, where a working station has been finished. On the 1640 level the north and south drifts continue in the favorable quartz body, mention of which has been made in previous reports.

OCCIDENTAL.—Upper tunnel—The south drift from the north incline winze has been extended 10 feet; total length, 80 feet. East crosscut from the same has been extended 11 feet; total length, 26 feet. Have retimbered a portion of the north incline winze from the 100 station to the lower tunnel. Extracted 10 tons of low-grade ore.

GOLDSTONE.—This mine is situated on the main range of mountains running north from Virginia, and is now being worked by a good substantial tunnel, which will cut the vein 150 feet below the surface. Now are in a blue clay wall, about five feet from which four or five inches of running water is coming. The tunnel is in about 150 feet. This mine is owned in London and San Francisco, and the company will drive the tunnel west completely across the Comstock mineral belt.

BEST AND BELCHER.—600 level—West crosscut No. 2 has been extended 38 feet; total length, 70 feet. The face of the drift is in a porphyry formation, showing quartz. 800 level—No. 4 west crosscut extended 30 feet; total length, 132 feet; porphyry formation.

GOULD AND CURRY.—425 level—East drift has been extended 24 feet; total length, 105 feet; porphyry and quartz mineralized, giving low assays. A vertical two-compartment upraise has been started in the south drift at a point 425 feet from the main west drift and advanced a distance of 28 feet. The top of the raise is in quartz and porphyry, showing some value.

HALE AND NORCROSS.—Work progresses favorably in the north drift on the 1200 level. The face of the last crosscut from this drift is in ore that gives good assays. The last few feet run in the south drift in this level is also in ore, which gives some good assays. The east crosscut 60 feet north from the face of this drift discloses some good ore.

UTAH.—472 level—The south drift from main west drift has been extended 40 feet; total length 192 feet. This drift has connected with the Sierra Nevada north lateral drift No. 2. At a point in the main west drift 400 feet from the shaft are preparing to start a north lateral drift.

CROWN POINT AND BELCHER.—The work of extracting ore continues about the same as a week ago. It comes from the 1500, 1600 and 1400 levels; also from the 200, 300 and 400 levels. The water in the 1700 station has not risen during the week.

POTOSI.—The crosscut on the 250 level south of the Linsley drift has passed through the ore a dip,

lance of 70 feet, and is now in clay. The south winze is down 70 feet, and the ore encountered is not quite as good as it has been.

SIERRA NEVADA.—\$20 level.—West crosscut No. 6 has been started from north lateral drift No. 2 at a point 60 feet north of west crosscut No. 2 and advanced 51 feet; porphyry formation.

BULLION.—Good progress is being made in the west drift on the 300 level. The formation is quartz of a lively character. The drift started last week from the east station has been advanced 20 feet.

KENTUCK.—The number of tons of ore hoisted to the surface during the past 10 days has decreased, owing to the quantity of water used in running the hurdy-gurdy wheel diminishing.

ALPHA AND EXCHEQUER.—The drift on the 122 level is being pushed ahead in the body of quartz encountered last week.

SCORMION.—Have commenced drifting east from the 300 level station. Everything working smoothly.

NORTH GOULD AND CURRY.—Repairing and re-opening the shaft continues, good progress being made.

CHOLLAR.—The shaft is cleaned out to a depth of 70 feet.

Eureka District.

ORE SHIPMENTS.—Eureka *Sentinel*, Jan. 22: During the past week ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Richmond works—Dandergberg mine, 91 tons; Prospect Mountain tunnel, 4½ tons; Silver Lick, 9 tons; Jackson, 48 tons; Bullwhacker, 2½ tons; Silver Connor, 5 tons; Eureka tunnel, 4 tons. Eureka Con. Co., Gilmore mine, 3½ tons; Dimick, 8 tons; Geddes & Bertrand, 18½ tons; A. R. Watson, 1½ tons; Eureka tunnel, 2 tons.

Garfield District.

A DIVIDEND.—Dayton *News-Reporter*, Jan. 21: The trustees of the Hinley mine, located in Garfield district, have declared another dividend of \$1.50 per share. This makes a total of \$18,750 which the stockholders have received during the last six months. It is giving better returns for the capital invested than any other mine in Nevada.

Hawthorne District.

THE LAPANTA.—Cor. Walker Lake *Bulletin*, Jan. 21: On 1st shaft level in crosscut, north, a winze has been sunk nine feet in the large ore body cut by this drift—bottom of winze is in same kind of ore. In main drift parallel to 1st shaft level, the winze is down 16 feet, carrying a heavy body of brown ore. The crosscut at west end of 1st shaft level running north has been extended 23 feet, total length 50 feet. The ground is still somewhat broken, but carries the ledge with it and looks extremely favorable. The stopes above the 1st shaft level on the west end are looking extremely well, and the ore is very rich (\$175 per ton in gold). In the west drift from foot of "No. 6" incline, the winze has been sunk 12 feet, encountering the footwall which at that point dips to the northeast and extends northwest and southeast; the heavy body of ore cut by this winze extends down to the footwall. The upper tunnel at the top of the main incline has been extended into the hill (north) 25 feet, showing a fine ledge of good ore (\$40 in gold) all the way along, and the same is very strong in the face—total length of tunnel 60 feet. The ground being prospected by this tunnel is all virgin ground, and the indications are extremely favorable for finding a large body of very rich ore. The usual amount of ore is being extracted, everything working smoothly in and about the mine.

Jefferson District.

GOOD ORE.—Belmont *Courier*, Jan. 22: The Jefferson chloriders are taking out good ore.

Madry District.

RICH ORE.—Belmont *Courier*, Jan. 22: Rich ore is being shipped from Morey.

Mount Ross District.

CONCENTRATED ORE.—Silver *State*, Jan. 22: E. Reinhart & Co. shipped yesterday to Argo, Colorado, 31,770 pounds of concentrated ore, valued at \$450 per ton, from the Paradise Valley mine.

Northumberland District.

CHLORIDERS.—Belmont *Courier*, Jan. 22: The chloriders of Northumberland district are taking out good ore.

Ressie River District.

MANHATTAN.—Reese River *Reveille*, Jan. 22: L. J. Hanchett, of Austin, is the general manager of the Manhattan property for the new company. It is the intention of the new management to begin work soon in adding improvements and increase the capacity in the reduction of ore. Four Huntington mills will be set up in the old Boston mill, after it has been thoroughly overhauled, and 12 concentrators, some of them Frue's and one or two of the Richmond patent will be tried. The company will discontinue the lease system, and put on day's pay men to develop the mines. The old furnace at the mill will be replaced by a Howard & White furnace, with dryers attached. The mill will be repaired from top to bottom. The new company intend to get things started as soon as possible.

Taylor District.

ARGUS MILL.—White Pine *News*, Jan. 22: The Argus mill was shut down Thursday for repairs, which will take seven or eight days to complete.

Tuscarora District.

NEVADA QUEEN.—During the week, No. 1 crosscut west, 200-foot level, has been extended 38 feet; total distance from north gangway, 198 feet. Shaft has been sunk 12 feet. North gangway, 350-foot level, has been advanced 11 feet. Rock continues hard.

NORTH BELLE ISLE.—North gangway, 400-foot level, has been driven 27 feet. Rock is hard, but breaks well.

NAVAJO.—No. 2 winze from east lateral, 350-foot level, has been sunk 7 feet. North drift on new vein, 150-foot level, has been advanced 11½ feet.

TORNADO CON.—Spent a good deal of time during the week in extending drain to face and in laying 300 feet of track. Also started a crosscut 150 feet in tunnel, westerly from footwall of ledge, to crosscut the entire lode, which is about 50 feet wide at this point.

BELLE ISLE.—*Times-Review*, Jan. 21: Belle

Isle and Navajo joint crosscut west, 150-foot level, has been extended 20 feet. East crosscut, same level, has been extended 4½ feet.

Union District.

SOLD.—Esmeralda *News*, Jan. 22: The series of mines formerly owned by Geo. W. Veach and located in Union mining district, in the vicinity of Lone and Grantsville, have been sold, and Mr. Peck, the manager for the company, is now in charge of the property and is repairing the mill at Knickerbocker canyon, which the company will have running in 60 days. The mines of this district have, in times past, yielded considerable bullion, the ore being chiefly gold and silver bearing. That country is in a fair way to have a boom and one which will be lasting. The mines are rich and the ledges well defined, and have facilities for cheap and economical reduction of the ore, there being an abundance of the finest pine timber and water. To George W. Veach is due the praise of resurrecting that camp from its Rtp Van Winkle slumber. Cincinnati capitalists now own this property, who will work it for what it contains and not as a stock gamble.

WORK PROGRESSING.—Belmont *Courier*, Jan. 22: Very little news comes from Western Nye, but we understand that work is progressing satisfactorily in the mill at Grantsville, and also in the Knickerbocker mill, which is being put in thorough repair under the direction of Thomas Mitchell. When complete, it will be started up on ore from the mines of the new Cincinnati company, and a long and prosperous run is confidently expected. Union Mining district has lively times in store for it this summer. Other mines in this district will probably be started up soon.

Ward District.

OF INTEREST TO MINERS.—White Pine *News*, Jan. 22: In another column will be found the notice of Mr. Culver, superintendent of the Martin White mines at Ward. He informs us he is prepared to let several very promising contracts to tributers in the company's mines on liberal terms. No doubt miners who have vim and ambition could do much better on such layouts than by working for day's pay.

ARIZONA.

SAMPLING WORKS.—Prescott *Courier*, Jan. 21: The sampling works will be erected near the railroad depot. J. B. Pace, of Hassayampa district, has brought in rich rock from the U. P. mine. Deputy Sheriff Hickey, while in Turkey creek district, the other day, was shown several tons of high-grade silver ore which had been taken out of the Roach mine. J. N. Redenberg and others are going to ship ore from mines in Walker district.

SMELTER.—Tombstone *Democrat*, Jan. 22: The smelter at Charleston continues in successful operation. Work on the hill in the different mines continues on a small but steady basis. The Toughnut mine resumed work Monday morning, thus proving that an era of better times is near at hand—in fact is already dawning. Mr. C. W. Leach informs the *Democrat* that he finds it impossible to obtain a sufficient number of miners in camp to meet his requirements in the operation of his mines. Cooper & McCracken are working their new find, and are taking out some very valuable ore. If indications are worth anything, this is one of the richest mines in the camp and its owners have a good thing.

TONTO BASIN.—Cor. Prescott *Courier*, Jan. 21: Charles Bacon, the veteran prospector of Tonto Basin, is still sinking on his Golden Rule mine. At a depth of 60 feet he has a three-foot vein of rich, free-milling gold quartz. He says Tonto Basin is bound to be one of the best mining districts in Arizona. Marion Brady is also in luck in his mine at the foot of the Matzats. He has a 3½-foot vein at a depth of 70 feet, which assays over \$100 per ton in silver, besides considerable gold, and is also free-milling. Mr. Brady has been repairing the O'Dougherty mill, on account of the bursting of two of the flues. It will be some time before the mill can be started up.

COLORADO.

IDAHO SPRINGS.—Gazette, Jan. 22: The Freeland is shipping its usual quantities of ore. The Plutus is now shipping more ore than usual. The late falling off was caused by the prosecution of development work. The Mattie mine is shipping a large quantity of ore. The mine is reported to be looking splendidly. The Crystal employs the usual force and ships regularly. The Argo is shipping unusual quantities of ore, which runs well. Several more jacks have been added to the train, and they are working day and night. Some few leasers are at work on the Donaldson. It's a pity to see such an excellent property lying almost dormant. The Champion, on Bellevue mountain, lies idle. This should not be, as it is one of the very best mines in the district. The Grand View, Seaton mountain, is being worked by a party of leasers. Hardy & Wright, working the Santa Fe, are bringing down to the Allen sampler the usual quantities of ore, some of which runs away up. The Santa Fe is one of the biggest mines in that district. It is reported that a prominent Seaton mountain mine is about to change ownership. Ben Allen has his hands full at the sampling works. Ore rolls in great quantities.

IDAHO.

FLINT DISTRICT.—Wood River *News-Miner*, Jan. 2: John Duff, formerly superintendent of the Big Lode mine, now superintendent of the Perseverance mine, in Flint district, Owyhee county, brought a shipment of ore from that mine on Monday to the smelter at Ketchum for reduction. The ore is high-grade concentrates. The mines in Flint were abandoned a few years ago, but good, practical men have taken hold of them and are now making them pay well, and the place is having a boom. They ship the ore to the Ketchum smelter because they get better rates than at any other place.

ROCKY BAR.—Wood River *News-Miner*, Jan. 14: The Alturas Limited Company (the old Ida Elmore) has a very fine new 50-stamp mill, which crushes 70 tons per day, and a 10-stamp mill that works 12 tons per day. Next year the company will add another 50-stamp mill and increase the 10-stamp mill to 30 stamps, making 130 stamps, capable of working nearly 200 tons per day. The ore from this mine works on an average \$22 per ton, which

will make, when the new machinery is added, a production of about \$4000 per day. The lode is from 5 to 20 feet wide, and no waste. This is probably one of the most valuable mining properties in the county.

MONTANA.

JEFFERSON COUNTY.—Cor. Butte *Miner*, Jan. 22: Your correspondent proposes bringing to the front those who have invested (some of them heavily) in an almost unknown region, which is now productive. I refer to that portion of the Territory lying between Butte City and Boulder. I start with the Major Budd, owned by Major D. D. Budd, Dan Welch and W. A. Clark. There are now two tunnels penetrating the mountain from the start. The western extension is owned by Major Budd and John Kelsey. The first tunnel starts from the central portion of the western extension and runs in 700 feet, crossing several good veins of base ore, inclusive of one good-paying streak 17 feet wide. The second tunnel is now in 1300 feet, and a force of 12 men are engaged in driving the material work to a 1500 breast. The work is being done on the drift of the vein, and is panning out ore which goes from \$135 to 600 ounces in silver, with heavy traces of gold. Steeping and drifting is the principal work being done, and the result from battery assays gives to the producers anywhere from \$60 to \$100 per ton in silver, and a heavy trace in gold. The eastern extension of this mine (the Major Budd) is owned by Henry Nikel et al. The Budd, which is producing so heavily now, is within 200 feet of the eastern extension, and so far as battery assays go, the products show an increase in silver, gold and lead, with a heavy strain of zinc and a small amount of carbonates. The lode is a true fissure silver-bearing quartz vein. The engineer reports in the Major Budd \$56,958 in ore stopes (in sight) and says "the average yield is \$66 per ton, silver, and if the ore bodies in the other two stopes were developed, I do not doubt large resources of ore would be exposed." Col. H. H. Horst is the next fortunate owner in mining property. His capital represents many thousands of dollars already expended, and very many more in sight ready to be taken out and transmogrified into ready cash. His group of mines have attracted the attention of Eastern and Western as well as European capitalists, and in the early spring a large force of men will be put to work in exploitation and general development of veins which are already panning out good pay ore.

MINING ACTIVITY.—Anaconda *Review*, Jan. 20: A gentleman who is as well acquainted as any one with the mining activity in this district, said, the other day, in conversation with a *Review* reporter: "I have never seen mining activity so suddenly brought to a standstill as has been the case in the mining district just west of Anaconda. Four weeks ago the hills were covered with prospectors, and in every little gulch work was being done. Now nothing is going on. The Blue-eyed Nellie is still running, and the O'Brien brothers have a few men at work on their mine. Their shaft is now down to a depth of 101 feet, and they are engaged in building a whim. They have four or five men at work. Cornelius & Co. have a few men at work taking ore out of the Iron-Silver lode. What was a few weeks ago a flourishing little mining camp over on Lost Creek is to-day entirely deserted. There is not a man left there. There is no cause for this except the severity of the weather. The mining district is new and miners were not yet fixed so as to stand severe cold and four or five feet of snow. Every one expresses confidence that good-paying properties will be found just west of Anaconda, and that the camp will boom as soon as the snow goes off." This is the view held by all who are acquainted with the discoveries made last season.

GRANITE AND PHILIPSBURG.—A gentleman who came down from Philipsburg on Thursday favored the *Review* with some pointers in regard to that flourishing camp. The Granite Mountain is running full blast and employing 300 men. On the 20th they will start up the new mill, which will increase the capacity of the works to 60 stamps. Previous to this they have been running only 20 stamps. The ore bodies in this great bonanza are looking finer than ever before. The Bimetallic mine is working about 60 men, and is supposed to have struck the same lead that the Granite Mountain is working. It is rumored that the old Algonquin mill at Hasmark will soon change hands and become the property of the Bimetallic. The North Granite is reported to have struck it rich. This mine is owned in Helena, and was formerly called the Kitty Hynes. It is being worked by Phil Sanders with a force of 30 men. The Black Pine prospect is looking splendidly. The stock is now selling at 75 cents.

NEW MEXICO.

KINGSTON.—Black Range, Jan. 22: The Albatross, belonging to Allen and Kent, is looking well. Mineral creek holds her own, and North Percha is looming up. A new gold strike is reported one-quarter mile northeast of Kingston. Alex. Rogers and Col. Gillette are doing some splendid development work on the Black Colt. It is reported that a chamber 400 feet in length has been struck in the Louisville on the east side of Ladrone gulch. Chas. J. Goff, superintendent and manager of the Black Range Lixivation Works at Chloride, called at the Socorro Union office Monday, and stated that these works would be ready to start in full operation by March 1, 1887. The last two carloads of machinery are on the road for the plant, and a large part of it is already in place. Mr. Goff is entitled to much credit for the energy and persistence which has enabled him to push this enterprise so near to successful completion. Chloride already feels its good effects. There is not a vacant house in the town, and life and activity everywhere is seen where one year ago everything languished except work on the Silver Monument. This move will be an important factor in the extension of the Magdalena branch toward the Black range.

OREGON.

GOOD PROFITS.—Bedrock *Democrat*, Jan. 22: The Connor Creek mine, near Snake river, in this county, has within the past six years and a half yielded its owners \$644,000 net profits, and during the time they have paid out for work, improvements and machinery \$616,216. There is no boom in this

mine; it is not incorporated but belongs to private individuals, who have constantly worked it for the time mentioned. This is one of the many mines in Baker county that are paying its owners nice dividends, and nothing said about them. It is true without question that this is the mine of Baker county. We have the above facts from the very best authority.

NEW QUARTZ DISCOVERY.—From Mr. Joseph Dolby, who was in this city last Thursday, we learn the following: Some time ago some prospectors went from Pine Creek into the Big Creek country, and after prospecting for some time were fortunate enough to find a good lead. At first the lead was only 1½ inches wide, but at a depth of 40 feet, the ledge has attained a width of 12 inches. The ledge has been christened the Anna Moore and is owned by McCue, Miles & Wilson. The rock in this ledge is free milling and assays as follows: Silver, 233 oz., 25 per cent lead and \$1.50 gold. Another mine was also discovered by Miles & Neal, and the quartz is mostly gold bearing, as it assays \$64 gold and \$2.75 silver. The ledge when first discovered was only ten inches wide, but has widened out to four feet at a depth of 30 feet. There is every indication of this district being as rich as Pine Creek, and we look forward to some very rich discoveries. Eastern Oregon is bound to take the lead in mining.

QUARTZ AND PLACER.—Jacksonville *Times*, Jan. 21: Smith & Lynch are doing good work at their mine on Wagner creek. All the miners have plenty of water and are correspondingly happy. Good work is now going on at John Miller's hydraulic mine on Farmer's flat. Considerable prospecting is progressing, notwithstanding the stormy weather. The Sterling Mining Co. have an abundance of water and are now operating two pipes. If there is no more frosty weather and a fair amount of rain, a good season is assured the miners. A gold nugget worth \$62 was dug up the other day in the abandoned channel of a creek in Pennsylvania. R. Morat's claim on Foot's creek has been put in excellent condition and much work is now being done there. O. H. Blount, of Ashland, has shipped his hydraulic pipe and little giant to his mines on Cottonwood creek, Cal. Work continues steadily on the extension of the tunnels of C. C. Beekman and the Jacksonville Milling and Mining Co. Considerable snow has fallen in the mountains during the past week, which will be quite available when spring comes. A. W. Sturgiss, of Jackass creek, has his new hydraulic pipe in operation and will make a big showing at the end of the season. Klippel, Howard & Co., of Applegate, have had their ditch full for the past few weeks and have already done considerable ground sluicing. Legg & McDonnell, of Jackass creek, have a good supply of water and yesterday increased their force. Wm. Smith, of Sam's valley, informs us that Jas. McDougall, while ground-sludging in Blackwell district, picked up a nugget of gold worth \$750 this week. Chas. W. Cornelius, having purchased L. D. Brown's interest in the quartz mill at work on ore from the Swinden ledge, is now on the scene and assisting to put everything in shipshape. Paul Cirac is taking a lot of quartz from an extension on Grob and Braendel's mine on Jackson creek which will be crushed at Klippel, Baumle & Co.'s mill as soon as the road in course of construction is finished. Geo. M. Willard and H. T. Bragdon, of Ashland, have bonded the hydraulic mines of Patterson Bros. on Grouse creek, in the Siskiyou mountains, and started this week with two men to begin work with the little giant.

UTAH.

PARK DISTRICT.—Record, Jan. 22: Recorder Brennan, of Uintah mining district, has been quite busy lately recording numerous locations of new properties in that district. The new year has also witnessed many mining locations in Blue ledge and Snake creek districts. The snow in the hills is getting deeper and operations are handicapped except around the leading properties.

THE NEW YORK GROUP.—This group, comprising a block of six claims, is situated southwest of the Ontario mine and adjoining the Story group on the west. Whatever there is in good location the New York group is favored, since it is in the center, nearly of the great Ontario and Daly mining belts. The development tunnel is in about 65 feet, and as soon as the weather permits work will be resumed on it. It is calculated that the tunnel will cut the ledge about 250 or 300 feet in the hill and at a considerable depth.

ORE AND BULLION SHIPMENTS.—The Crescent shipped during the week 216,000 pounds of first-class ore. For the week just ended the Mackintosh sampler received 393,810 pounds of Ontario and 109,490 pounds of Daly ore; total 503,300 pounds. On Wednesday, the 19th, the Ontario shipped 28 bars of bullion, containing 17,251.72 fine silver ounces. Yesterday there was turned out of the Marsac mill eight bars of Daly bullion, containing 8179 fine ounces of silver.

SANDSTONE NOTES.—Southern Utah *Times*, Jan. 12: Stormont Co. is offering great inducements to chloriders to secure their ore for reduction at the River mill. Bayless & Co.'s Leaching Works started up last Monday; capacity, ten tons daily. Their ore runs from 15 to 20 ounces, of which there is enough for a long run. Kemple & Crandall have out a large shipment of ore from the Leeds mine, which will be worked by N. B. & Co. leachers. This mine is furnishing almost enough ore to keep these works employed without having to draw upon the tailing pit. Last week's ore output from the Stormont's properties was 235 tons of good grade. Bullion shipment for December footed up 12,700 ounces silver. Hessel & Thiesen delivered two tons of screenings from the old Pioneer mill to the Stormont people. During Mr. Vivian's absence J. V. Curtis is acting foreman and John Ivey, Sr., is night boss.

PARK NOTES.—Record, Jan. 8: The beginning of the new year in the Park witnessed considerable re-locating of claims, and in the dead of night several old-timers as well as some tenderfoot jumped a few unimportant and scattering claims. Relocating and jumping claims by the wholesale has, however, become a thing of the past. There was no trouble or bloodshed over carrying out the first principles of mining at the opening of the new year this time in our midst.

MECHANICAL PROGRESS.

A New Car Wheel.

Mr. Harvey W. Fowler, of Chicago, has devised a new car wheel which is thought by many railway engineers to possess decided advantages over any other wheel heretofore devised. Mr. Fowler's method consists of casting a solid integral wheel blank having a rudimentary flange, a hub and web substantially complete as to dimensions and form, and a rim which at the tread and flange is larger in diameter than the finished wheel desired; and in peripherally rolling the rim and concentrically reducing the diameter of the blank to the diameter desired in the finished wheel, and thereby evenly condensing the metal at the outer portion of the rim in radial and peripheral lines and developing the flange and hardening the tread of the wheel. There is thus produced an integral cast-steel car wheel having its hub, its web and the main portion of its rim composed of metal in its normal soft and tough condition, and a flange and tread composed of metal which is hardened and condensed in radial and peripheral lines—the entire wheel evenly condensed and solidified by rolling, perfectly circular, and finished smooth as planished iron. It is claimed that this process of rolling and condensing the metal in the tire of the solid wheel produces a tread and flange equal to hammered steel, giving the best possible wearing surface, as well as removing all danger incident to the use of a make-up or combination wheel of which the tire and center are separate and distinct parts. The metal is taken in the form of a cast blank for each wheel, heated to a temperature lower than that used for rolling steel rails, and is condensed by rolling to a form mathematically circular. So great is the pressure in the process of rolling that the diameter of the blank is reduced two inches from the size it was at the commencement of the treatment. Rolling has the same relative effect in condensing and toughening the metal that the hammer and anvil of the blacksmith have upon heated steel. The benefits of this invention are claimed to be, in substance, as follows: 1, absolute safety; 2, durability consequent upon the process of manufacture; 3, lightness; 4, certainty of absolute rotundity; 5, perfect uniformity in finish; 6, cheapness, as compared with the composite steel tire wheel.

A little over a year ago Mr. Fowler constructed a model machine with which he produced small car wheels about eight inches in diameter with the most satisfactory results, and in September last he completed the construction, at Pittsburgh, of a full-sized machine with a capacity to produce 25 wheels per hour, which, at its first trial, proved such a complete success that the Fowler Steel Car Wheel Co. was organized with a paid-up capital of \$250,000. Seven acres of ground have been purchased in Chicago, and works are now being erected which will have a capacity of 80 wheels per day. It is intended to enlarge these works as the demand for the wheels increases until they will have a capacity of from 400 to 500 wheels per day, and it is expected to have the wheel in the market during next summer. Patents have been issued in the United States and in foreign countries on the wheel and the machinery for its production.

Machinery and Inventions.

The never-ending invention of mechanical and other contrivances for minimizing manual labor leads to the supposition that, by and by, the latter will be dispensed with altogether, and that human existence will become a state of sinecure. If this consummation were ever to be obtained, however, it is pretty certain that life would become unendurable, and that mankind would soon cease to exist altogether. We have no apprehensions, says an English writer in the *Foreman, Engineer and Draughtsman*, as to the arrival of either of the contingencies in question. Machinery will ever be the handmaid of humanity, but never its destroyer; and every real improvement made therein, being only a new application of the force of nature, must be advantageous to the human family. No machine of any kind can possibly create power, and no combination of wheels, pinions, levers, belts or cranks, however ingeniously arranged, will raise a single foot-pound of power, or even one ounce. Suppose a watch he taken by way of illustration. In order to set it in action the spring must be bent and contracted by means of a key, and this imparts power from the muscles of the fingers. When this spring has given off the muscular force put into it the wheels, and hands of the time-keeper come to a standstill. Again, in winding up an eight-day clock, you lift a weight of, say six pounds, through four feet. In doing so you perform 24 foot-pounds of muscular power. These 24 foot-pounds will serve this clock 8 days; and, unless more power be applied, this machinery will stop. The same principle applies to mechanical contrivances of every kind, whether impelled by steam or by sentient bone and muscle. In fact, all work is derived from the source of nature, which, in turn, have derived their present existence and form from the workings of nature; or, to be more explicit and exact, from the heat of the sun, which has developed and is developing all the natural laws by which we are surrounded. There is no fear, then, of our getting beyond nature, nor of machinery of any kind ever add-

ing one iota to the stock of power, latent or active, in nature's arcana. We may modify and adapt, but we can neither create nor destroy; and may rest assured, therefore, that all discoveries in science and in mechanism will tend eventually to the good of mankind and the glory of the Creator of all things.

HIGH AND LOW LOCOMOTIVES.—Contrary to the generally received opinion, says two locomotives, each with wheels the same distance apart, laterally, but the one with a low center of gravity and the other with a little higher center of gravity, the latter will be least liable to be overturned when on the rails. For many years the contrary opinion was held by most engineers, and by some is so held to this day. This opinion is sustained by both practice and theory. The theory is given by the *London Engineer* as follows: The gauge of the rails represents the base of a triangle, and the center of gravity of the engine represents its apex. Now, if a side strain be caused to act on the apex of a triangle, it can be resolved into two other forces on the triangle if we regard it for the moment as a truss or as a solid body. One of these forces will create a rotating strain, resembling in effect the action on a crank, if we regard the lower corner of the triangle furthest from the pushing strain as the shaft, and the apex or point where the strain is applied as the crank-pin. The lower corner of the triangle is the turning point of the strain, the purely rotary force being equal to the amount of the applied strain multiplied by the sine of the angle at the turning point. But there is a lateral strain also, tending to simply push the triangular body sideways; and the magnitude of this stress will be equal to that of the applied force multiplied by the sine of half the top angle of the triangle or half its base. From this it will be obvious that the greater the lower angle and its natural sine, as compared with half the apex-angle and its natural sine, the greater will be the overturning or rotating force, and the less will be the lateral strain on the rail.

ALUMINUM.—The metal aluminum appears to have met with a decided advance in its application to the arts from the new and cheaper mode of its production by the Cowles electrical process now in successful operation on a large scale. The metal by this process is not produced pure, but in the form of an alloy consisting of 10% of copper to 90 of aluminum; and what is both remarkable and fortunate, this very alloy is found to be the strongest metal hitherto known, recent tests having shown the phenomenal strength of 181,000 pounds to the square inch, which is nearly double the maximum tensile strength of 70,000 pounds required for Krupp cannon, made of the best steel. The alloy is valued on the basis of only \$2.50 per pound for the contained aluminum. It is also reported that an alloy of 10 parts of aluminum with 1 part of tin has been invented by Bourbons, which is whiter than the first-named metal, and is more easily worked, beside soldering without any special preparation. Three tons of the Cowles alloy was recently ordered by one party in a single order for use in the arts.

NEW METHOD OF MANUFACTURING SHAFTING.—The plan has been proposed to manufacture rolled and polished shafting by a new method. This round bar of metal delivered from an ordinary rolling mill, while at a cherry heat, is subjected to the action of a group of tapering condensing rolls, which act peripherally and progressively upon the bar while the latter is rotating. After the bar has left these rolls, and when it is substantially free from heat, it is introduced into a die-drawing machine of suitable construction. By this double manipulation the surface of the metal is first worked in one direction for producing a condensed, scaleless surface, and then in a direction substantially at right angles to the first, for producing the finish. The shaft made according to this method is said to be of uniform diameter, and to have its surface metal condensed, hardened, and free from pits and checks.

MORE INVENTIONS WANTED.—The following enumerations of inventions wanted, which we clip from an English journal, mentions several which we have not seen called for before: Macaroni machinery, good red-lead pencils, type-writers that will work on account-books and record-books, indelible stamp canceling ink, a practical car etarator, a good railway-car ventilator, better horse-shoes, locomotive headlights, an instrument for measuring the velocity of wind currents, apparatus for measuring the depth of the sea without sounding by line, piano-lid hinge which shall be flush on the outside, good fluid India ink for draftsmen, a good metallic railway tie, an effective cut-off for locomotive, a method of alloying copper and iron, and a molding material for iron and brass casting capable of giving a mold that can be used over and over again.

TRANSPORTING HOT IRON.—A car is being constructed at the Eliza furnace, in Pittsburgh, which is to be used in conveying metal from it to the American Iron Works directly opposite. It is to be of iron, and will be lined in the interior with brick. Tanks into which natural gas will be introduced are to be added. These will furnish the heat which is to keep the metal warm from the time it is discharged from the cupola till it is taken over the bridge to the works.

SCIENTIFIC PROGRESS.

Inhabitants of Other Worlds.

The *Popular Science News* presents in a late issue an article bearing on this subject, in which it sets forth one reason why such bodies as the moon, Jupiter and Saturn could not be inhabited by beings of the same physical constitution as mankind, even supposing that other conditions governing existence there should be favorable, which is not the case. The argument in question depends on the action of gravitation at the surface of these several bodies. Thus, at the moon's surface, the force of attraction being very much less than at the earth's surface, a being constituted like man, and endowed with the same muscular energy, could leap to astonishing distances, clearing for example a three-story brick house with the same ease that he would clear a post and rail fence on the earth; the elephant would become as light-footed as the deer; a stone thrown from the hand of a thoughtless boy might fall in an adjoining county before accomplishing its mission of destruction; armies could engage each other in battle at great distances apart; and all kinds of labor would be greatly lightened by reason of the diminished weight of tools and materials. While this state of things might not render human life, endowed as we have it on earth, impossible on the moon, the opposite state of things which would prevail on Jupiter and Saturn would certainly render life, in reality, a burden. The masses of Jupiter and Saturn being so much greater than that of the earth, the correspondingly greater attractions which they would exert would so impede locomotion that unless endowed with enormously greater muscular power than he is gifted with on the earth, man would only be able to crawl along as though his feet were weighted with lead, while the larger animals in all probability would be crushed by their own weight.

Where the Cold Waves Come From.

A Chicago cotemporary, who has been shivering from the effect of the cold rains which have recently moved with such frigid force over that city, writes as follows:

This question is frequently asked, "Where do the cold waves come from?" Manitoba is generally credited with the cold waves that sweep down from the north in this longitude. We are assured, however, that this is a mistake. It is said that meteorological observations have now become so extended that evidence is rapidly accumulating to enable us to determine positively the source of the cold aerial waves which sweep across this country during the winter season. The indications are that we owe them to the area of high barometer in Northeastern Siberia, where the pressure sometimes exceeds 31.50 inches, and the temperature falls so low as 75° below zero. The pole of the greatest cold is in the neighborhood of Yokretsk, on the Lena, where the average thermometric reading in January is 41° below zero, and where the severest cold exceeds by 10° that experienced by explorers in the high Arctic regions. This is also the region of the highest barometric pressure known in winter; and from it, doubtless, proceed the waves of intense cold which play so large a part in our winter experiences. Having found out where the cold waves come from, it will be in order for science to go to work to seek and see if there are no means by which they can be diverted from their course and sent to cool some more heated portion of the globe. At all events, there are a good many people in this favored city who wish the bitter cold which reaches us in these last December days could be sent in some other direction—to Hades, for instance.

RECONSTRUCTION OF ANCIENT PERFUMES.—Two ancient Egyptian perfumes have been reconstituted through the researches of a young French professor at Lyons, who has devoted himself to studying Egyptian sepulchurs and the plants of the Nile valley. By hunting through the papyrus texts and the inscriptions on the walls of the temple laboratories, he has found the receipts for the manufacture of "tasi" and "kyphi." The former was a temple perfume, used to anoint the statues of the Egyptian Venus. "Kyphi" was more important, and, beside being used at home for the rites of Isis and Serapis, was imported into Greece and Rome after the conquest of Egypt. It then became the favorite perfume among the luxurious Greeks and Romans, who were anointed with "kyphi" after the bath and were sprinkled with the essences during the grand banquets, while sometimes it was used to perfume the wine.

THE TOTAL ECLIPSE FOR THE PRESENT YEAR.—The year 1887 has in store for astronomers a total eclipse of the sun, which can be observed from convenient stations in Europe. This eclipse occurs on the 19th of August, and the line of totality passes through Berlin and a little to the north of Moscow. The event will give astronomers an excellent opportunity to pursue their studies of the sun's surroundings. Our Government ought to make immediate preparations to send a large and well-equipped party to observe this eclipse. Excellent results might be obtained in determining the extent of the sun's surroundings by the use of rapid photograph lenses of wide angle in ordinary cameras. It is to be hoped that the matter

of this eclipse will be laid before Congress in time for suitable preparation. Congress has always shown a willingness to provide ample means for observation of total eclipses and other great astronomical events. But that body has often been so tardy that lack of adequate preparation has greatly interfered with successful observation. This lack of preparation has ever been due to the tardy manner in which Congress has acted. Observations on the total eclipse of last year were neglected by our astronomers, because a committee of the National Academy of Science reported to Congress before the appropriations were made that the time was then already too short to make the necessary preparations. American astronomers may well devote their attention to two subjects: The determination of the character and extent of the sun's vaporous surroundings, and the search for intra-Mercurial planets. This search should not be given over, for the non-eclipse of such planets has not been demonstrated, and there are excellent reasons for believing that their existence may yet be completely established.

ANCIENT CIVILIZATION.—No man can see Peru without wondering at the remains of its ancient grandeur—the industry and intelligences of the remote Incas' empires. Those people had art that the world never knew; thrift which their conquerors could not imitate; and wealth which made them the prey to every adventurer of the sixteenth century. Their temples and palaces were built of hewn stone from quarries that the Spaniards had never been able to discover, and the means by which they lifted blocks of granite weighing hundreds of tons is a problem which no antiquarian has been able to solve. They knew how to harden copper until it had an edge as keen and enduring as the finest of modern steel; they made ornaments of gold and silver as skillfully as the lapidaries of to-day, and their fabrics of wool end cotton were spun and woven as smoothly as those made by our modern looms. They surpassed modern civilization in many things, and had a system of government under which millions of people lived and labored as one family, with everything in common; knowing all arts save those of war, and worshiping a deity whose attributes were almost parallel to those of the living Christian God. Hemmed in on one side by the impassable snows of the Andes, and on the other by the desert sands, lifted above the rest of the world unknown to them, in spirit as well as fact, as peaceful as the Andean stars, they established a system of civilization to which, for the first time since creation, the equal rights of every human being were recognized and observed.

GALVANIC ACTION AND EXPANSION IN THE BARTHOLOMI STATUE.—In order to protect the Bartholdi statue against galvanic action, an ingenious insulation of the copper from the iron framework has been employed, the insulating material used being asbestos cloth soaked in shellac. The device has been managed so cunningly that in no place do the two metals come in contact with each other. It was at first feared that the durability of this statue would be threatened by the great expansion and contraction it would be subjected to under different temperatures, thereby wearing out the copper rivets, or even straining the frame. Experience so far has shown that the mottled or corrugated surface, due to the hammering the copper had received, has prevented much of the expansion that the direct rays of the sun would otherwise have caused. No two contiguous parts received the same amount of heat, and the expansion in midsummer was found to be much less than had been feared. Whether expansion and contraction will eventually produce a serious injury of any kind cannot now be decided, but the indications are not at all alarming.

CHALK FORMATION BY SEAWEEDS.—We find that attention is directed to some observations which are said to have been made in the Mediterranean sea of the manner in which chalk is formed by seaweeds. The *Lithothamnium* of the Bay of Naples were especially studied. They grow at depths of from 100 to 300 feet, a class of algae remarkably poor in organic matter, but rich in mineral constituents, among which carbonate of lime is preponderant. They grow to be as large as the hand, and then die without suffering change of form by decomposition. Living plants attach themselves to dead ones, and thus extensive deposits are formed. Beds of pure, uncrystallized chalk remain after the gradual disappearance of the organic matter, the vacancies left by which are gradually filled with calcareous substance. Beds of chalk thus formed may, under some conditions, attain great thickness.

THE BOOK OF NATURE.—"Everything," says Hugh Miller, "is writing nature's history, from pebble to planet. The scratches of the rolling rock, the channels of the river, the falling rain, the hurried fern, the footprint in the snow, and every act of man inscribes the map of her march. The air is full of sounds, the sky is full of memoranda and signatures, which are more or less legible to every intelligent human being."

ARTIFICIAL COCAINE is said to have been recently prepared, which is alleged to possess all the reactions of the natural product. It is prepared mainly from one of the many derivations of coal oil.

Roasting and Leaching of Silver Ores.

NUMBER 5—CONCLUDED.

[Written for the Press by CARL A. SCHENCK.]

The Work of the Cleanup.

On the first of each month this work begins and takes from five to six days till it is finished. The regularity of the leaching and precipitating work is only slightly interfered with as one vat is cleaned up after the other; it takes from five to six hours to pump out the precipitate of any one vat. If the capacity of the two draining tanks were larger, or if there were more than two, this pumping business could be done in one day. Under existing circumstances it takes from three to four days.

The clear hypo is first drawn off by the swinging pipe, but not quite down to the turning point; the cap is next screwed to the outlet into the pump, and all the valves closed with the exception of the one belonging to the vat to be cleaned up; the drawing end of the three awing pipes of the vat not under treatment are also put under hypo, to prevent the possibility of the sucking of air during the pumping. The precipitate and remaining hypo are now well stirred up, the drawing end is let down and the centrifugal pump put in motion, while the stirring is kept up with vigor. With the progress in pumping the drawing end is let down deeper and deeper, lifting thicker mud from the bottom, and at this period, notwithstanding the continuous stirring, the pump frequently refuses to act. The necessity arises, therefore, of diluting the mud with more hypo, whenever the pump fails, which, of course, does not contain any silver and is directly drawn from the storage vat, and of using other time-losing makeshifts. In the fourth precipitation vat, which is a new one, the plan of pumping from the bottom by means of an extra pipe has been adopted with better results.

The slushy precipitate of any one vat cannot be pumped out in one uninterrupted run, on account of the two draining vats, into which the flow from the pump discharge is from the top, not holding the entire volume of silver sulphide and hypo, if it were pumped over in one run. After the first filling the pure hypo is, therefore, allowed to drain off, and returned, by a pipe, to the leaching. When in this manner, after a couple hours, more room has again been provided, the balance of the precipitate is pumped over, and the cleaned-out vat returned to the regular work. The draining vats are provided with perforated false bottoms; from the true bottom, a pipe starts off, through which the filtrated hypo is returned, by gravity, to one of the precipitating vats. Canvas for filtering, fastened to the top of the staves, hangs loosely, with more or less folds, in and around the sides of the draining vat, and is spread out over the perforated false bottom. Each of the draining vats is, also, provided with a circular hole, about 3½ inches through, immediately above the false bottom, for the delivery of the drained precipitate to the roasting furnace. A corresponding hole is cut out in the canvas. This opening is closed by a gasket and iron plate, firmly screwed to the staves from the outside, during the period of draining. The precipitate is allowed to drain over night, whereupon it is transferred to the reverberatory roasting furnace by taking off the iron plate and gasket, and pushing the still muddy material through the open hole into an inclined wooden trough, on the bottom of which it slides down and into the furnace, through a hopper in the arch of the latter. It may be said that this is only a temporary expedient, which, in time, must make room for more suitable contrivances.

The roasted precipitate does not undergo any other metallurgical change, but is shipped as such to refining works.

MINING AT PINO.—The Laird Mining Company, James Laird superintendent, is running night and day, and gives employment to 12 or 14 men. Their output is not known, but it appears to be satisfactory. They have a pan with cross-arms and steel teeth to separate the cement from the gravel and pulverize it. They run their machinery by water with the aid of the underhoist wheel. The Lee mine, J. S. Wall superintendent, is also running day and night and employs 20 men. They have a new stamp mill run by steam-power. When they bought the mine they also bought the old S. R. Bradley ranch of 320 acres, and have made many improvements, such as repairing the stone house and barn, putting up new fences, etc. They are about to rebuild the fences around the whole place, and are clearing off the brush from a large portion and grubbing it. They contemplate setting out a number of trees and vines this winter. The Hoadley mine is leased to some parties from Sacramento, who have six men at work sinking a shaft and making other improvements. They will put more men at work as soon as the shaft is down. The Horse-shoe mine, owned by George Lee and J. S. Wall, is shut down at present, but is expected to start up within 60 days. The Klee mine is not being worked at present. It is expected that there will be several more mines opened in this vicinity within the next six months.—*Cor. Auburn Republican.*

REDUCING THE WASTE.—It is said that there is not over six pounds of waste to the largest ox now killed at a Chicago packing-house.

USEFUL INFORMATION.

A SERMON TO EMPLOYEES.—The following is a verbatim copy of a notice which the Chicago, Burlington & Quincy Company has printed, framed and sent to various shops and offices, where they are posted for the benefit of employees. The sentiment conveyed is given as that which actuates the officials of the company in their treatment of employees: "The servant, man or woman, who begins a negotiation for service by inquiring what privileges are attached to the offered situation, and whose energy is put chiefly in stipulations, reservations and conditions to 'lessen the burden' of the place, will not be found worth the hiring. The clerk whose last place was 'too hard for him' has a poor introduction to a new sphere of duty. There is only one spirit that ever achieves a great success. The man who seeks only how to make himself useful, whose aim is to render himself indispensable to his employer, whose whole being is animated with the purpose to fill the largest possible place in the walk assigned to him, has in the exhibition of that spirit the guarantee of success. He commands the situation and shall walk in the light of prosperity all his days. On the other hand, the man who accepts the unwholesome advice of the demagogue, and seeks only how little he may do, and how easy he may render his place and not lose his employment altogether, is unfit for service; as soon as there is a supernumerary on the list he becomes disengaged as least valuable to his employer. The man who is afraid of doing too much is near of kin to him who seeks to do nothing, and was begot in the same family; they are neither of them in the least degree a relation to the man whose willingness to do everything possible to his touch places him at the head of the active list."

NEW DECORATING MATERIAL.—A new material for the decoration of interior walls and ceilings is made from chemical wood fiber. The sheet or roll of chemical wood fiber of the desired thickness is taken while wet or damp, and any desired raised design or pattern is reduced in high relief by means of suitable embossing rolls or dies, after which it is allowed to dry, and may then be colored or bronzed if desired, or it may be colored in the pulp if preferred. Chemical fiber is especially adapted as a material for embossed wall coverings, as its great elasticity permits it to be very deeply embossed without liability of breaking as it is stretched, thus enabling designs to be successfully produced in high relief with a smooth and unbroken surface, while after being stretched in the embossing process the strength and toughness of the fibers will cause the design to permanently retain its form, and effectually resist any pressure to which it might be subjected in the operation of applying the material to a wall or ceiling.—*Paper World.*

THE EXPLOSION OF POWDER.—It is found that if a charge of gunpowder be placed in the chamber of a gun, the gravimetric density of the charge being unity, and if it be completely exploded before the shot is allowed to move, the state of things immediately prior to the shot being permitted to move in the power chamber, roughly speaking, is as follows: The products of explosion are divided into two classes of substances, about two-fifths, by weight, of the powder being in the form of permanent gases and three-fifths solid matter, the latter being perfectly liquid at the moment of explosion, and in an extremely fine state of division. By the combustion is generated some 730 units of heat, the temperature of the explosion is about 4000° F., and the exploded powder exercises a pressure of about 6500 atmospheres, in the neighborhood of some 43 tons to the square inch, or about 90,000 pounds per square inch, against the walls of the chamber and against the projectile, a force and power almost inconceivable.

A DURABLE GILDING SOLUTION.—A durable and beautiful gilding solution is thus described in *La Monde de la Science*: Crystallized phosphate of soda 60 parts, 10 of bisulphide of soda, 1 of cyanide of potassium, 2½ of chloride of gold and 1000 of distilled or rain water, by weight. To prepare this bath properly the water is divided into three portions, namely, one of 700 and two of 150 each. The sodic phosphate is dissolved in the first portion, the chloride of gold in the second, and the bisulphide of soda and cyanide of potassium in the third. The first two portions are gradually mixed together, and the third is afterward added. With this solution the artisan uses a platinum anode, a wire or strip, adding fresh portions of the gold salt as the solution becomes exhausted.

RAPID WORK.—Some idea of the extent to which mechanical ingenuity and efficiency have advanced may be had from the following statement: "It is now possible to construct a complete sewing machine in a minute, or 60 in one hour; a reaper every 15 minutes, or less; 300 watchcases in a day, complete in all their appointments. More important than this, even, is the fact that it is possible to construct a locomotive in a day. From the plans of the draughtsman to the execution of them by the workmen, every wheel, lever, valve and rod may be constructed from the metal to the engine intact. Every rivet may be driven in the boiler, every tube in the tube sheets, and from the smoke-stack to the ash-pan, a locomotive may be

turned out in a working day, completely equipped, ready to do the work of 100 horses." Without such machinery and the skilled labor to operate them, the civilized world of today would be an impossibility.—*Exchange.*

A DRIVING JOINT.—An ingenious driving joint that has all the movements of a universal coupling is now being introduced by the Universal Joint Company of New York. One shaft is connected with the other by two hemispherical gear wheels. These wheels are held in mesh by linkwork and segment gears that retain the spherical wheels on their centers in every position of the shafting. The joint can turn in any direction, giving any angle within a radius of 360°. The speed with which it can be driven is stated at the wide range of from 100 to 2500 revolutions a minute, making it applicable in many places where light power is used, such as for polishing, drilling, boring, and numerous places where a flexible joint is wanted.

TO DETECT BARYTA IN WHITE LEAD.—The most common adulterant of white lead is permanent white or sulphate of baryta. This admixture may be recognized by boiling a small quantity of the pigment in a glass test tube or flask with nitric acid diluted with an equal measure of water. The white lead dissolves, but any sulphate of baryta remains a white residue. The residue should be allowed to settle, the clear liquid poured off, and the deposit again treated with nitric acid and then boiled with water.

COMPOUND RAILWAY SLEEPERS.—Mr. C. Renison, of the Netherlands State Railway, has devised a means of using up old wooden sleepers. Sleepers generally fail where the rail rests, leaving a round length of about three feet in the center. Two such pieces are joined end to end by a piece of channel iron. The rail rests on the channel iron, which thus prevents it from wearing into the sleeper. As these compound sleepers have four end faces, they offer more resistance to lateral motion than ordinary sleepers.

EXPANSION OF RAILWAY TRACK.—In climates having a difference of 70° in temperature between hot and cold seasons, a railroad track of 400 miles is 338 yards longer in summer than in winter. Of course, the length of road remains the same, but expansion forces the lengths of metal closer together, making an aggregate closing up of space between the rails of nearly a yard in each mile.

TO DETECT ALCOHOL.—If any fluid is suspected of containing alcohol, add pulverized chromate of potash and sulphuric or muriatic acid and warm the mixture. If any alcohol is present, the mixture will turn green.

MINERAL WOOL has come so largely into demand that it is now made directly from raw materials placed in the furnace, and not from such ores only as will produce other merchantable products.

AMONG the many valuable uses to which paper can be put, none equals that of advertising. If properly utilized in this respect it will increase its value beyond calculation.

GOOD HEALTH.

The Health of Our Women and Girls.

[Written for the Press by JEWELL.]

A sick girl asked me the other day, "if there was any way that I could keep her feet and limbs warm?"

Poor child! thin, bloodless, suffering creature! Just when she should be strong, hearty, and happy in the health that youth demands, and should have as a birthright, she is listless, sick, and discouraged; a sorrow and a burden to parents and friends, instead of being in a condition to repay all care given her in childhood. But there is hope for her, if she begins to inquire how to keep warm, and a desire still lingers in her heart to get well. So I tried to explain why her feet were cold, what effect bloodless feet and hands have upon the rest of the body, and how to get them warm and keep them so; to all of which she listened in rapt attention, saying, "If I had only known more of these laws of health years ago, I never would have been where I am now!"

So, friends, girls who are strong and well, and mothers who have small girls growing up about you, perhaps if I tell you what I told her, you may, by trying to study God's physical laws as well as His moral laws, be able to save many a doctor's bill and much suffering through life. Cold extremities are an indication of an unbalanced circulation. If the blood does not flow unimpeded from brain to the toe tip, it is a sign that for some cause it is delayed in its progress and will sooner or later cause inflammation or congestion of some organ, thus laying the foundation of serious sickness. Therefore, the feet should be kept warm by hot foot baths, artificial heat and warm woolen stockings and thick shoes—exercise, or in any way best suited to occasion and person. Remember the blood must be somewhere; if it is not in the feet it is probably engorging the lungs, or stomach and bowels, or the uterus or kidneys are the over-

taxed organs entailing endless misery and expense upon the sufferer. If I had but three words in which to convey the most important command for the well-being of humanity, they would be "equalize the circulation," as the disobedience of that first law underlies much of the sickness and suffering of humanity. Therefore clothe the body warm, especially the limbs and feet of our women and girls—heavy flannel first, and then cotton flannel over in winter, and with loose akirt blouse, well supported by the shoulders. No ligatures should be used about the calf of the leg to impede circulation, but stocking supporters instead, and loose, thick shoes, comfortable and useful for walking.

When will women begin to dress for comfort and health rather than entirely for appearance? I fear not until they fully appreciate the real necessity for so doing, believing it a duty they owe themselves and posterity, and to their conscience, to know and obey God's physical laws. I can sympathize with the girl who dresses for appearance, but one can look nicely and yet be comfortably dressed. The beauty of health is itself unsurpassed by anything artificial in dress or appearance.

Nothing can excuse or justify a neglect of health. And when it depends upon comfort in dress coupled with duty and independence, what further argument is needed in its favor? *Los Gatos.*

DIPHTHERIA IN SAN FRANCISCO.—The frequent reports of cases of diphtheria occurring in this city within the past few weeks have led a great many timid people to imagine that we are at present suffering from an epidemic of this dread disease. To such an extent, indeed, has this belief spread that many people in the interior are afraid to come to the city, and others who have failed to hear of the supposed epidemic until reaching the city have endured a state of most uncomfortable suspense until they succeeded in getting out of town. That all such fears are groundless is proven in a number of ways. There is no denying, of course, that the diphtheria is here; it is always here at this time of the year, and, for that matter, in all large cities whenever the proper season for its development arrives, which is governed to a great extent by climatic influences; but it is here in a much milder form than usual, and, in proportion to the number of cases, the death rate from this cause is unusually low. But, people inquire, why then is it that we hear so much of the diphtheria? Simply for the reason that the regulations of the Health Department are more rigid, and cases are reported now that formerly would never have been heard of. Diphtheria also prevails quite extensively throughout the State, more generally there, as here, in a mild form, readily yielding to proper treatment. The increased prevalence of the disease in this city is attributed to the bad condition of one of our main sewers, for the drainage of which we have not had the usual quantity of rain. The excess of cases comes entirely from the vicinity of that sewer. At this present writing the disease has greatly abated—the number of cases is now not larger than usual.

POISONOUS CLAMS.—According to recent researches, it appears that clams, or mussels, are not a very safe sort of diet. Reports are often made of severe and extensive sickness due to the eating of mussels, and investigations which have been made show that the poisonous part of the mussel is its liver. The clam, as well as its relative, the oyster, is a scavenger. This is probably why nature has given it its enormous liver, to enable it to live on its gross and unwholesome diet. The liver of the clam, like the human liver, is a self-sacrificing organ, and gathers the poison of the clam's filthy food into itself, thus protecting the rest of the creature's body. The experiments made show that if rabbits, or other small animals, were inoculated with the liver of the poisonous mussels, they died in one or two minutes. A German doctor, who has been engaged in this investigation, advises that shell fish should be discarded as an article of diet, as it is impossible to tell poisonous fish from healthy ones in any other way than by trial. It certainly seems as though there were plenty of good foods among the great number of fruits, grains and vegetables with which nature has bountifully supplied us, without ransacking the bed of the ocean for these slimy scavengers.

EVILS OF OVER-EATING.—Sir Henry Thompson thinks that more than half the diseases which embitter life are due to errors in diet, and that the mischief done in the form of shortened life is greater from indiscriminate eating than from the use of alcoholic drink. An over-supply of nutrition, which must go somewhere, produces liver disease, gout, rheumatism, and various other disorders. To eat too much is a blunder, and to wash down nutritious food with nutritious drink is one of the greatest dietary indiscretions that can be indulged in, especially for persons of sedentary habits.

MUSCULAR RHEUMATISM AND TRICHINÆ.—Dr. Grawitz, assistant to Prof. Virchow, states as the result of extensive observation, with unequaled facilities, that about one-third of the cases diagnosed in life as muscular rheumatism are shown by examination after death to be due to trichinosis. The writer has met with the parasites in post-mortem examination in cases in which they must have been present for many years.

MINING SCIENTIFIC PRESS

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DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Jan. 29, 1887.

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Passing Events.

We print an edition of 24 pages of the MINING AND SCIENTIFIC PRESS this week in order to make room for the statistical review of the mining operations of the coast for the past year. This will be found not only of passing interest but available for reference in the future as a record of the year.

After the fine rain of last week the weather hereabouts appears to have settled into a state that upholds the glories of the climate in winter. The days are warm and sunny, with no wind and a clear atmosphere.

The Legislature is in session, but they have hardly got as far as the passing of hills yet.

The Southern California mines are attracting more attention than formerly. San Bernardino and San Diego counties are in a region near where Eastern capital has concentrated of late, and this is bound to benefit the mining interests.

Oregon is advertising her mineral resources well of late. For many years her mines have been neglected, but now much more attention is being paid to them.

GREAT excitement prevails at Clayton, California, at the foot of Mount Diablo, Contra Costa county, over the discovery of gold. A miner named Stevens, who has prospected three months, found a well-defined lead assaying \$25 per ton. Over a hundred claims have already been located.

Mining Review for 1886.

A Prosperous Year.

Increased Product of Bullion, Improvements, Progress, etc.

The year 1886 has passed without the occurrence of any specially noteworthy movement or event in the mining world. But while the year has been so uneventful, the business of mining for the precious metals has been attended with generally good results throughout the mineral regions of the central and far West, where it has been prosecuted with less excitement, but with more system and energy, than ever before. Toward the end of the year the mining share market, which for a long time had been exceedingly sluggish, with limited sales and low prices, experienced a season of unwonted animation, the prices of shares in the leading Comstock mines having in the course of a few weeks advanced several hundred per cent with large transactions meanwhile. Although the excitement consequent on this deal has nearly subsided, the prices of stocks have not, as yet, receded to the low figures prevailing prior to its inauguration. Nevertheless, they are much lower than they were a month or two since, with a still drooping tendency. Being now about over, it is pertinent to observe, that this movement has resulted as all such movements do, in the enrichment of the few at the expense of the many, the losers, as usual, excreting the business of mining for their ill luck.

The Aggregate Product of Bullion

During the year under review has been large—the largest, in fact, ever made in the several countries credited with its production, having amounted to \$103,011,761. This sum is over four and a half million dollars in excess of the bullion yield of 1877—the next largest on record.

Bullion Product.

We are indebted to John W. Valentine, Vice-President and General Manager of Wells, Fargo & Co., for the following valuable statistics in relation to the product of precious metals for the Pacific Coast and Mexico:

The following is a copy of our annual statement of precious metals produced in the States and Territories west of the Missouri river (including British Columbia, and receipts by express from the West Coast States of Mexico) during 1886, which shows aggregate products as follows: Gold, \$30,773,759; silver, \$53,776,055; copper, \$9,276,755; lead, \$9,185,192. Total gross result, \$103,011,761.

As stated hitherto, the facilities afforded for the transportation of bullion, ores and base metals by the extension of railroads into mining districts increase the difficulty of verifying the reports of the products from several important localities, and the general tendency is to exaggeration when the actual values are not obtainable from authentic sources, but the aggregate result, as shown herein, we think may be relied on with reasonable confidence as approximately correct:

STATES AND TERRITORIES.	Gold Dust and Bullion by Express.	Gold Dust and Bullion by other con- veyances.	Silver Bul- lion by Ex- press.	Ores and Base Bul- lion by Freight.	Total.
California.....	\$12,670,366	\$ 673,673	\$ 918,403	\$ 563,943	\$14,690,385
Nevada.....	1,730,639		5,602,886	1,287,866	9,168,920
Utah.....	181,093		1,310		182,403
Washington.....	320,975				320,975
Alaska.....	50,000				50,000
Idaho.....	800,000				800,000
Montana.....	2,100,000				2,100,000
Utah.....	10,140				10,140
Colorado.....	3,640,000				3,640,000
New Mexico.....	3,080,759				3,080,759
Arizona.....	16,750,000				16,750,000
British Columbia.....	3,837,878				3,837,878
British Columbia.....	1,371,437				1,371,437
British Columbia.....	2,538,500				2,538,500
British Columbia.....	400,000				400,000
British Columbia.....	803,845				803,845
Totals.....	\$26,397,737	\$2,163,673	\$23,224,701	\$4,035,655	\$103,011,761

The gross yield for 1886, shown above, segre- gated, is approximately as follows:		
	Per cent.	Amount.
Gold.....	29.87	\$30,773,759
Silver.....	52.21	53,776,055
Copper.....	9.00	9,276,755
Lead.....	8.92	9,185,192
Total.....		\$103,011,761

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	Per cent.	Amount.
Gold	29.87	\$30,773,759
Silver	52.21	\$53,776,055
Copper	9.00	\$9,276,755
Lead	8.92	\$9,185,192
Total		\$103,011,761

Annual Products of Lead, Copper, Silver and Gold in the States and Territories West of the Missouri River, 1870-1886.

YEARS.	Lead.	Copper.	Silver.	Gold.
1870	\$5,234,000	\$1,000,000	\$17,320,000	\$3,750,000
1871	5,234,000	1,000,000	18,250,000	3,838,000
1872	6,238,000	1,250,000	19,924,439	38,177,385
1873	7,238,000	1,450,000	20,453,302	39,504,638
1874	7,401,045	1,450,000	23,609,132	33,688,194
1875	8,089,000	1,600,000	30,232,934	42,988,853
1876	8,076,772	1,600,000	31,636,230	43,589,833
1877	8,219,839	1,600,000	32,540,109	44,589,233
1878	8,219,839	1,600,000	32,540,109	44,589,233
1879	8,219,839	1,600,000	32,540,109	44,589,233
1880	8,219,839	1,600,000	32,540,109	44,589,233
1881	8,219,839	1,600,000	32,540,109	44,589,233
1882	8,219,839	1,600,000	32,540,109	44,589,233
1883	8,219,839	1,600,000	32,540,109	44,589,233
1884	8,219,839	1,600,000	32,540,109	44,589,233
1885	8,219,839	1,600,000	32,540,109	44,589,233
1886	8,219,839	1,600,000	32,540,109	44,589,233

The exports of silver during the past year to Japan, China, the Straits, etc., have been as follows: From London, \$26,519,323; from Marseilles, \$956,650; from Venice, \$ —; from San Francisco, \$16,553,612. Total, \$44,034,590, as against \$56,109,949, last year. Pounds Sterling estimated at \$4.84.

While the figures furnished by Mr. Valentine are, no doubt, in most cases approximately correct, we incline to think he is a little out of the way in some of his estimates. If the value of the gold and silver extracted from the mines of California last year did not exceed \$14,690,385, as Mr. Valentine makes it, then our sources of information on that point have been very misleading. Consulting such data as have come to hand, we had reason to suppose such value would have been greater by \$3,000,000 or \$4,000,000 at least. We certainly had no idea that the California output of bullion was less last year than for the preceding year, yet according to Mr. Valentine's returns, such was the case, the falling off having amounted to \$346,287. What makes such result the more surprising is that this falling off was in the silver product, the gold product for 1886 having exceeded that of 1885 by \$870,020. The value of the silver produced in California during these two years, Mr. Valentine being authority, was \$2,698,653 and \$1,482,351 respectively, showing for the year 1886 a falling off equal to \$1,216,307. From what our exchanges from the silver-producing districts of the State have to say about the output of that metal during the year, we had been led to believe that it was nearly up to that of the preceding year. We were prepared to hear of some reduction in the Calico country, San Bernardino county, owing to the destruction of the Bonanza King mill at Providence Mountain over a year ago, since which it has not been rebuilt. This company turned out more silver than any other one in that region, and its loss has necessarily made considerable difference in the bullion yield of that county, the low prices ruling for silver having, of course, had a tendency there, as elsewhere, to restrict the production of that metal. As mining operations in Inyo county, another silver-producing section of the State, appear to have been active during the past year, the yield of this metal there has presumably been kept up to its normal standard. Some little silver has come to hand during the year from Mono, Alpine and Shasta counties, with a trifle also from other portions of the State, receipts from these sources having equalled perhaps those of late years, Shasta showing some increase.

As regards the gold product of California for the year we are considering, here again we are disappointed with Mr. Valentine's figures. We can hardly believe that the sum of \$13,208,034 fully represents the gold extracted from the mines in this State last year, considering how actively and successfully the business

was carried on in every one of its branches except hydraulic washing. It is notorious that both vein and placer operations, with the exception mentioned, have been undergoing steady enlargement of late, the growth of quartz and drift mining having been the subject of general comment. The year has also been a remarkably good one for the river-had miners, nor has it, in any department of the business, been especially unfavorable. With San Bernardino and Nevada counties claiming to have produced \$3,000,000 each last year, Sierra and Amador counties \$2,000,000 each, and a score of other counties in the State known to have produced variously from \$100,000 to \$600,000 or \$800,000 each, we conclude that Mr. Valentine, in computing the value of the precious metals produced in California last year, is out of the way by three or four million dollars at least.

We are aware that over-estimates in this class of data are not desirable. This is especially true as regards silver, so many being fearful that there will occur a glut of this metal. The exaggerated reports as to the probable product of the Comstock mines worked a great injury to those engaged in mining for silver, the apprehension that it would become overabundant having had much to do in causing its demonetization in certain quarters. We suspect that the difficulty of verifying the reports of the bullion produced in the more remote mining districts since the extension of railroads into such localities is even greater than Mr. Valentine himself declares them to be. At the same time we believe he is right in saying the general tendency is to exaggeration when actual values are not obtainable from authentic sources. That this local statistician is prone to magnify the product of his vicinage is undeniably true.

Composition of Bullion.

Segregating the bullion produced in the various countries mentioned, it is found to be composed of gold, silver, copper and lead in the proportions here named: Gold, \$30,773,759; silver, \$53,776,055; copper, \$9,276,755; lead, \$9,185,192, the percentage of each metal being approximately as follows: Gold, 29.87; silver, 52.21; copper, 9; and lead, 8.92.

It will be observed on referring to the table given that the bullion of Oregon, Washington, Alaska, Dakota and British Columbia consists almost wholly of gold, that of California being made up of about 85 per cent gold, the balance being nearly all of silver. In the other Pacific States and Territories, copper and lead make up from 35 to 60 per cent of the bullion product of those countries. Even according to Mr. Valentine's showing, the gold product of California is not only larger than that of any of the other countries named, but it is nearly as large as their joint product. While the bullion made in Colorado last year is valued at \$25,000,000, the value of her gold raised barely three and a half million dollars, being hardly more than one-quarter as much as was produced in California, which still remains the largest gold-producing country in the world.

That Idaho, Montana, Utah and Colorado should have turned out last year such large values in silver, copper and lead, considering the low prices that ruled for these metals, denotes the energy with which these branches of mining have there been prosecuted, as well as the perfection to which they have been brought. It also speaks well for the mineral resources of these countries, which in these several metals are no doubt great. All of them, with the exception of Utah, made large gains in their bullion product last year as compared with the year before. As the prices of these metals are not likely to suffer any further decline, and may even be expected to undergo some improvement in the early future, the chances are that the present rates of bullion production in these countries will be maintained throughout the current year. The

Quartz-Mining Industry of California

Has during the year just closed made creditable progress, both as regards the discovery of new mines, the development of old ones and the many valuable improvements that have been introduced into the business. Never in any former year has such substantial progress or so many gains been made. The spirit of invention has been rife, bringing into existence many new processes, mechanisms and devices, the most of which have possessed more or less merit, some being of the highest utility. The

number of new ore-crushers introduced has been especially large, several of these machines combining efficiency and cheapness in a marked degree. New concentrators, amalgamators, rock-breakers, gold savers, fuel-savers and labor-savers have been claiming the services of the patent agencies and the patronage of the mining public.

Of these many novel contrivances much good has come or is likely to come, all recognizing that the quartz-mining industry with us is still in its stages of experimentation and trial, so far as ore reduction is concerned.

Being portable and cheap, a great many of these small quartz mills have lately come into use. They answer a good purpose in numerous instances, not a few of our quartz lodes being of limited extent. Through the many economies that have been effected in quartz mining,

Ore of Comparatively Low Grade can now be Worked with Profit in California.

Provided the conditions are tolerably favorable. While our auriferous quartz yields a higher average percentage of gold, perhaps, than that of any other country, we mine and reduce a great deal that does not yield over four or five dollars per ton, and some even of lower grade; of the mines in this State that work large quantities of rather lean ores with satisfactory results, the Sierra Buttes and the Plumas-Eureka furnish two notable examples. During the year 1885 the Sierra Buttes Company mined and reduced 54,479 tons of ore, which yielded, sulphurets included, at the rate of \$6.98 per ton, producing a total of \$370,263.42. The cost of mining this ore was \$4.06 per ton; milling, 56 cents per ton; management and deadwork, prospecting included, \$1.21, making a total of \$5.83 per ton, with a resultant net profit of \$1.15 per ton; total profits for the year, \$62,627.85. During the first half of the year the company ran 60 and during the latter half 93 stamps, the number that has since been running. The Plumas-Eureka Company, running 60 stamps the entire year, mined and milled 56,052 tons of ore, which yielded \$322,841, being at the rate of \$7.60 per ton. The cost of mining was here \$4.36; milling, 61 cents; management, deadwork, etc., 60 cents per ton; total, \$5.57; net, \$2.03 per ton. During the year the Sierra Buttes Company were under heavy expenses for tunnels and other improvements, a burden from which they are now in good measure relieved, nor will their extra expenses for some time to come be at all onerous. Water-power is here used as a motor; at the Plumas-Eureka mine both water and steam. There is an abundance of hie timber in the vicinity of these mines; common miners' wages \$2.50 per day; cost of living, \$6 per week. During the past seven years, while the value of the ore and the cost of handling it have been slightly reduced, the quantity mined and milled has been considerably increased. In the Sierra Buttes mine a large stock of ore of the above grade has been developed, the established reserves in the Plumas-Eureka being apparently of less extent.

During the past year the 50-stamp mill on the Grand Victory mine, El Dorado county, has been running at least part of the time, and reducing ore at a cost of 40 cents per ton, 225 tons being passed through the batteries daily. This is a friable ore, easily crushed and easily mined, the cost of extraction not exceeding 25 cents per ton, the mine thus far having been worked as an open quarry. This mill is run by water. The ore taken from the Alabama mine, Tuolumne county, yields on an average not over \$3.25 per ton; yet the owners operate the property with some profit, the ore being reduced in a 40-stamp water-driven mill, at the rate of 80 tons per day. Cost of mining, 40 cents per ton; cost of milling, 70 cents per ton. The ore here, of which a large body has been developed, is taken out through open cuts and tunnels. Other examples, similar to the above, might be cited, tending to show the cheapness with which gold-bearing quartz can now be mined and milled in California.

Even in some of our high-grade ore-yielding mines, like the Young America and the Alaska, these several items of expense are not much greater than at the Sierra Buttes and Plumas-Eureka; while at the Plymouth Consolidated mine, in Amador county, where the ore yields an average of over \$13 per ton, the cost of these items is even less, amounting to barely \$4 per ton. Here, however, the quantity of ore re-

duced is large, no less than 160 stamps running on the output of this mine.

In nothing has the business of quartz mining received such assurance of future expansion as in this ability of our miners and metallurgists to handle with profit these low-grade ores of which we have such an abundance in California. In establishing the fact that this class of ore can be utilized to advantage, we assimilate this branch of mining with those other great industries which in all countries insure steady employment to labor and command the confidence of investors because of their recognized permanence and utility. We have reached a point in the history of this industry when with the conservative capitalist large and immediate gains are less sought after than moderate, long-continued and certain ones. Rich strikes, while they create an excitement and thus tend to subserve the purposes of the speculator, are not promotive of legitimate and healthy mining.

Of course, the richer the ore provided we have it in quantity the better; and, as before remarked, there can be no doubt but the auriferous quartz of California is of higher average grade than that of any other country. Nor is this character of ore confined to a few lodes or a single locality. It occurs in all parts of our gold fields. While many of the veins in Mariposa and Fresno counties on the south are noted for the rich ores they carry, Sierra in the center, and Trinity, Shasta and Siskiyou at the north end of the main gold belt, are equally distinguished in this respect. In these counties the ores in entire districts are of this character. In the South Fork district, Shasta county, the veins are small, but they are numerous, and their entire contents yield over \$23 per ton. The ore from the mines, some 50 in number, situated in the French Gulch and the Deadwood districts, has averaged over \$20 per ton. Some of the mines in these districts, which lie along a quartz belt extending from Shasta west into Trinity county, have been worked steadily for more than 30 years, and have always yielded, as they are still doing, ore of high grade. While these are old mines, many of which have been long worked, every year and almost every month brings with them new discoveries of this kind. In this category may be classed the deposits found not long since in the East Fork and the New River districts, Trinity county; also the recent strikes made in the Osceola and in the Rising Sun mines, near Alleghany City, Sierra county, a neighborhood noted from the early day for rich finds in both placer and quartz. The Delhi and the Young America, in the same county, both opened within the past two years, have already distinguished themselves as large and profitable lullion-producers. And so California, while earning a reputation for great store of low-grade ores, is likely to maintain her fame for innumerable high-grade deposits as well.

In the foregoing connection it is pertinent to observe that, while we have so demonstrated our ability to utilize material low in the precious metals, we have also met with marked success in

The Treatment of Our Base and Refractory Ores.

Which also abound in many parts of our mineral domain, but of which but little account had until lately been taken because of our inability, through lack of experience and skill, to benefit them with profit. The business of mining and reducing this school of ores, now that we have mastered it so well, must rapidly grow into one of great magnitude and importance. For a time at first the mining of smelting ores in California was confined to Cerro Gordo and two or three other smaller camps in Inyo county. But with the discovery of this class of ore in many other localities in the State, plant adapted for its treatment is likely to be greatly multiplied hereafter. The plan of concentrating the non-smelting base ores and treating the concentrates by chlorination or otherwise is likely also to undergo here early enlargement, the localities where this will probably be most practiced having already been indicated. It may be expected, too, that increased attention will be paid to saving by concentration the sulphurets contained in our gold-bearing quartz, much of which has heretofore been suffered to go to waste.

Inquiry at the Selby Lead Works shows that the opening of new mines and reworking of old

ones has greatly increased their business in gold, silver and lead bullion. They are now obliged to increase the capacity of their works, though provision was made for this when they were moved to Vallejo Junction. They now need almost double the capacity they had when starting. Miners have discovered many ways in which they can get their ores to better advantage, and larger quantities are now received at the works. The amount of refining has increased materially, especially of Comstock bullion. A good deal of gold and silver also comes from the Cœur d'Alene region, Idaho, and some lead from Wood River. Large shipments are coming from Mexico which were formerly sent East. They found that the Selby Co. can make quicker returns and handle the bullion more satisfactorily by reason of improved facilities, and a great deal of bullion now comes here. The Selby Works are prepared to treat ore or bullion, and have every facility for handling all mining products.

Turning from vein to placer operations, we find that this department of gold mining has been fairly prospered during the year we are remarking upon.

Hydraulic Operations.

Since the closing by legal procedure of this class of mines in the central mining counties of the State, have, of course, been greatly curtailed, the gold obtained from this source having been diminished to about one-fourth of what it once was. This reduction would have been considerable greater, but for some increment in the business in the more northerly counties, where it has not as yet been interfered with by legal process, nor is it at all probable that it ever will be, as there is no agricultural or other interest there exposed to be injured by its continuance. The gold turned out from this source amounted last year to a million dollars or a little more, a sum that will no doubt be somewhat increased hereafter, as hydraulic washing is bound to undergo a marked expansion in these northern counties, more especially in Siskiyou, Trinity and Del Norte, the conditions attending its prosecution there being extremely favorable. Should the improvements projected on the Pioneer mine on the Ocean beach in Humboldt county, be carried out, a notable increment of the hydraulic product of the State would ensue, as this property, which covers the most of that remarkable deposit known as the Original Gold Bluff, is very extensive and capable, even under partial development of turning out enormous quantities of gold.

As regards the controversy between the engaged hydraulic miners and their opponents, it may be observed that the former, though now completely restrained from working their claims, do not despair of being able to ultimately resume operations, at least in part; this hope being based upon their ability to impound or otherwise so dispose of their tailings that no appreciable damage will be done to the farming lands or the navigable streams below. During the past year no hydraulic washing has been carried on in any of the districts placed under the ban of the courts. As a consequence, the hydraulic mine owners in these districts have been reduced to desperate straits, the most of them having been financially ruined. Hundreds of laborers have been thrown out of work, with little chance of getting other employment, and altogether, such a condition of things has thus been brought about as appeals forcibly to the law-making powers for relief, if by any possibility means for extending such relief can be devised. Not for many years have

The Drift Mines of California

Turned out larger aggregate or better average results than in 1886. Twenty-five to 30 years ago when thousands of men were rifling the rich chambers of the "Dead Rivers" that, situated near the surface, were easily reached and emptied of their contents, the product from this source was, of course, much greater than at present. But not probably during any one year since that period has this class of deposits yielded up as much gold as during the past 12 months, nor have the net profits on the gross production made ever been much greater. Avoiding the mistakes that formerly attended drift operations, our miners, aided by lessened expenses and cheapened labor, have been able to transform what was once an extremely hazardous business into one noted for its steady and certain returns. No branch of mining is to-day less risky or more remunerative than this.

But it is so only in skilled hands and where good judgment is observed in selecting a site for carrying it on. Without these, failures would be as common now as they ever were, nor is it long since much money was being lost through inattention to these indispensable conditions. While these hurried channels of the Pliocene epoch are very extensive and almost everywhere rich in gold, only at a few points along them can they be attacked to advantage, large sections of them being so situated that their exploitation is well-nigh impracticable. There are about 3000 hands employed in the drift mines of this State, the annual product of which amounts to about \$5,000,000. The year 1886, owing to the late advent of the fall rains, proved to be an unusually favorable one for

River-Bed Operations.

Which, as for many years past, continued to be prosecuted mainly along the Klamath, Salmon, Scott and Trinity rivers in the northwestern part of the State. Along many of the streams further south, however, a good deal of this kind of work is again being done, it having there for a long time been intermitted. The beds of these streams having been worked out in the early day were afterward nearly all abandoned or given up to the Chinese, who continued to work some of them in spots and in a limited way. Having in the course of time become gradually enriched, through the enormous quantities of tailings poured into them, these riverbeds have of late years come to be worked again quite extensively, and generally with remunerative results. The working season here extends from the time the water falls to a low stage in the rivers till they are again raised by the advent of the winter rains; it reaches, therefore, usually from the last of July to about the middle of November, it having last year been but little interrupted until January. Having been so prolonged, the amount of gold taken out was much larger than usual, reaching probably a million and a half dollars. As not much besides labor goes into this species of mining, the profits attending it are apt to be large; they are always so when the season proves favorable. During the period of active operations there are about 4000 men engaged in river-bed mining in California. Two-thirds of the number are Chinamen, who prosecute the business for the most part by means of wing-damming, this, when so conducted, being with them a favorite style of mining.

Having examined in a general way the leading branches of gold mining, going now a little more into detail and considering the affairs of this industry in the several mining counties of the State, we summarize as follows:

Amador.

Along the mother lode, the principal mineral belt traversing this county, the past has been a year of much activity. Work on most of the old mines has been pushed vigorously. New work has been commenced on a number of lodes and a fair amount of general prospecting has been done. Some foreign and still more local capital has come into the county. To the Plymouth Consolidated mine 40 more stamps have been added, making 160 stamps now running on ore from that mine. Several small mines situated near the Plymouth are being operated with fair success. A 40 stamp mill has been built and started upon the old Kennedy mine, one of the stand-bys of the district.

At Amador City the mining interests are in a flourishing condition. The South Spring Hill has increased the number of its stamps, and a 60-stamp mill is to be put on the Quartz Mountain mine, now running ten stamps. Several mine sales are reported at Sutter Creek, which means the introduction of foreign capital at that point. Amador claims to be among the first mining counties in the State, and the number of stamps crushing quartz and the large number of paying mines within it fully substantiate the claim.

Butte.

In this county fair progress has been made during the past year in quartz, river-bed and drift mining, now the only branches of the business here pursued, the hydraulic claims, with a single exception—that of the Spring Valley Company—having all been shut down by order of the courts. This company, operating extensively at Cherokee, have not been restrained from running, as they dump and retain all the heavier portions of their debris on their own ground. The Big Bend tunnel, on Feather river, after having been completed last summer, was found to be insufficient to carry all the water of that stream. As a consequence, the working of the river-bed at that point has to be postponed another year. Meantime, the work of enlarging the tunnel is in progress, and will, no doubt, be completed in time to make it available for the purpose intended next summer. This only delays but does not defeat the success bound to attend this great enterprise.

The outlook for the mining industry in Butte is, according to the *Oroville Register*, extremely flattering. The two main sources of gold remain there almost untouched, these consisting of the beds, bars and channels of the river systems belonging to an earlier geological age than the present; and the many quartz lodes that have been discovered and slightly prospected.

The deep-channel mining can only be pursued at an expense greater than the ordinary miner can afford, and hence these rich channels have been left for men of capital to open and work. As far as they have been developed they promise enormous returns, and large sums of gold will be taken from them during the next few years.

Quartz mining is yet in its infancy, and when fairly under way will give employment to a large number of men, and turn out vast quantities of gold. Capital will seek investments in mines, for they promise as certain returns and a far better rate of interest than almost any other investment that can be made.

In addition to the two grand sources named, it is confidently expected that large amounts of gold will be taken from the river-beds at Big Bend and other mines of that kind now being opened.

Within the past 10 years a number of old river channels have been opened up in this county. These are to be found chiefly along the Dogtown ridge and in the vicinity of Butte creek. At some period of the world's history a network of rivers, ravines and small gulches existed, extending from the north fork of Feather river north to Lassen Buttes, all running in a southwesterly direction. By reason of some great convulsion in nature the whole country was overflowed by lava. As time passed the melting snows and heavy rains wore gulches so deep as to erode the lava down to the beds of the ancient streams, and in these old river-beds are found immense deposits of gold. In some places it is found in such abundance that men have to see it before they can comprehend the exceeding richness of these old channels. In proof of this we need only to refer to the Magalia gold mine, near Dogtown. In one case the evidence taken on the late trial showed that this mine paid \$1000 for every three-foot run ahead. This is only one of many mines already discovered, and others are being added to the number every week.

These mines give work to a large number of men. A much larger force would be employed, and many more mines opened and worked, were it not for the fear that after men had invested their capital they would be enjoined and the mines closed down.

Now, we must have the gold that lies buried in those old channels. These mines must be opened. These hills must be teeming with crowds of strong, active miners, engaged in taking out this gold. The farmers went it in exchange for their hay, their fruits, their pork, and their beef, and they are going to have it. The farmer and the miner have each learned to his sorrow that he did a very foolish thing when he went to law, the one against the other. Instead of each benefiting the other, he simply turned his money into the hungry lawyer's hopper. The great water suit has been compromised by the principals getting together and talking the matter over. Let the farmer and the miner do the same thing. We must have the gold.

Calaveras.

Gold mining in this county continues in a healthy and progressive condition, as is evinced by the fact that nearly \$1,000,000 of outside capital has been invested in the mines there during the past year. Toward the end of the summer an English syndicate purchased the Union quartz mine, and erected on the same a 30-stamp mill with hoisting works, etc., the plant put up here having cost the company \$110,000. Several other less costly mills have been put up, and much developing work has been done. A number of old and neglected mines have been reopened, the copper mines at Copperopolis, in the southern part of the county, being among the number. Most of the mines in the vicinity of Angels' Camp have been worked quite steadily and with fair results. Renewed attention is being turned to Carson Hill, a famous mining locality in the past, and one that possesses beyond any question large intrinsic merit. Work on the extensive tunnel designed to drain the head of the Stanislaus river, near Robinson's Ferry, has been pushed with vigor, similar enterprises on the same stream having been projected.

The late purchase by the Southern Pacific Railroad Company of the San Joaquin & Sierra Nevada narrow-gauge road, with the assurance of the gauge being widened and the road extended to the timber belt, insures the development of a lumber industry that will be of priceless value to the county.

Del Norte.

Gold mining in this county is now mostly confined to hydraulic gravel washing, which is carried on at several points quite extensively. The Del Norte Gravel-Mining Company, operating on Hurdy Gurdy, a tributary of Smith river, cleaned up last year about \$65,000, a product that is calculated can be kept up for many years to come. As the gravel is rich and easily washed, the profits of the company are large. The debris question can never give any trouble here, as Smith river, which has no farming land along it and is not a navigable stream, receives the hydraulic tailings and carrying them down empties them directly into the ocean. There are rich copper mines in this county, but they have not been worked

of late; also deposits of chromic iron which in times past have yielded large quantities of this ore, some having been taken out recently. Promising indications of coal abound in Del Norte, but their extent or value has not yet been proved.

El Dorado.

A local paper, in commenting on the mining industry in this county, says: Within the past year several new quartz mills have been built and are now in operation here. Judging from the fine prospects of several quartz claims which are being energetically developed, it is quite safe to reckon upon at least a dozen more mills being built in this county during the present year.

In the southwestern part of the county quartz mining has, within the past 18 months, been sensibly revived, and with very encouraging results. On the Springfield mine, the shaft, at a depth of 1200 feet, shows a five-foot vein of \$35 ore, this vein having expanded from two feet above to its present size at the depth mentioned. A contract has been let for sinking this shaft another 200 feet, it being the purpose of the owners of this property, Messrs. Hayward & Hohart, to exploit it, as they do all their work with system and thoroughness. The Volante mine, the old McNulty, located on the same lode with the Springfield, is being emptied of its water and restored to a working condition. It is in good hands, and when rehabilitated will, no doubt, be able to continue its former favorable record.

It is evident, says the same paper, that there will be more progress made in quartz mining on the Georgetown divide during 1887 than there has been for a number of years past. There are several new mines being developed in this vicinity, which, no doubt, will prove to be valuable properties. What we most need is more capital to develop our quartz mines; the placer mines on this divide have been among the richest in California, and we believe that the time is not far distant when El Dorado will again be one of the foremost counties in the State in the production of gold.

While team mining has been carried on to considerable extent, our large lodes of low-grade ore (which will yet become our most permanent mines) have been very much neglected, as it requires more capital to develop them and erect mills, which is necessary to put them in a paying condition. With the improved mining machinery of the present day, we are satisfied that many of our mines may be made to pay very well. This divide also has many natural advantages, as there is but little snow here with abundance of timber and water for mining purposes; the California Water Co. having one of the best water storages in the State.

There are many of our mines that can be worked through tunnels and by water-power which very materially lessens the cost of operating them. Several mines in this part of the county, that have been idle for a number of years, are now being put in better condition for working than they have ever been before; and the indications now are that there will be several quartz mills erected on this divide before the close of 1887. There are a number of mines in this vicinity that we would like to speak of, and we will endeavor to do so in the future as opportunity offers.

Fresno.

There are many good quartz mines in this county, several of which are being actively and profitably worked. Still the mineral wealth of Fresno has of late been much neglected, having been partially overshadowed by her agricultural resources. Nevertheless, the gold-bearing quartz lodes here have more recently excited some interest, and a number of them have passed from the hands of the discoverers into those of mining capitalists. J. B. Haggin, George Hearst, John McNally, John Pfeiffer, G. W. Grayson and others have invested heavily, and several quartz mills have been erected, and are now turning out bullion in paying quantities. The best informed estimate the bullion output of the county this year at \$1,000,000.

Humboldt.

Although this is more of a stock-raising, farming and lumbering than a mining county, there are still many valuable mineral deposits within its borders. In the northeastern portion of Humboldt some placer mining is carried on along the Trinity, Salmon and Klamath rivers; but there is little or no quartz mining done in the county. The Pioneer mine, located on the ocean beach, in the western part of the county, covers most of the locality known as Gold Bluff, and is considered a very valuable property. Heretofore, the only mining done at this point has consisted in gathering the auriferous sand exposed at low tide, and packing it up on the beach and there washing it in sluices. This, though a remunerative business, is so disproportioned to the productive capacities of this deposit that the owner has had the line of a ditch surveyed and located, with a view to bringing in water and conducting washing operations by the hydraulic process, and on an extensive scale. When this is done, a large and profitable production of gold can be here counted upon, as the bulk of the gravel, which extends over thousands of acres, is known to be rich. That the projected enterprise comprises the elements of a great and permanent success, admits of no doubt.

Inyo.

While Inyo contains within her borders more mineral territory as well, perhaps, as a greater variety of mineral products, than any other

county in the State, it has, by reason of its remoteness and its difficult access, been until recently kept in the background. With a railroad traversing it centrally and connecting it with the outside world, the mining industries of Inyo have made considerable progress, their outlook being at the present time decidedly good.

Up to 1883 the county was credited with an output of \$14,850,000 in silver, gold and lead. The product is steadily expanding now, but as most of the ores are shipped out by the Carson & Colorado railroad, there remain no means of ascertaining the product, unless Wells, Fargo & Co. gather the statistics elsewhere. The new marble works near Swansea have developed a most important and lasting industry. The horate fields are absolutely inexhaustible, one firm alone having obtained title to over 100,000 acres. As the railroad is extended to connection with the Southern Pacific, through the southern districts, the mining interests will forge ahead, securing for Inyo the distinction of being the second silver and lead producing county of the State.

Kern.

Which once turned out considerable bullion, has of late years fallen into the sere and yellow leaf as a gold-producer, agriculture, in its various branches, having here, as in Fresno, come to outrank mining. The failure of the big mill erected at Kernville several years ago put a damper on quartz mining in this county, from which it has not yet recovered. The coming in of sulphureted ore at the line of permanent water in the rich small veins on White river, causing work to be suspended, was another discouraging circumstance in the history of quartz mining in Kern, the work suspended on these mines many years ago having only in a few instances since been resumed. With the improvements made in handling this class of ore it may be expected that mining in this county will undergo early revival.

Mariposa.

Having like Kern lost caste as a mining county, is again coming to the front, its resources in this direction being large and favorably situated for development. The disastrous results that many years ago attended the mining enterprises inaugurated on the great Fremont estate, tended to weaken confidence everywhere in the mineral resources of this county, this feeling of distrust having been greatly intensified by the Hite Cove swindle, perpetrated more recently on Eastern parties, and from the effects of which Mariposa has not yet fully recovered. This Hite's Cove mine, having fallen back into the hands of the original owner, is being cleared of water and restored to condition to be worked again, additional machinery having been provided for the purpose. The damage that this fraudulent sale has worked Mariposa ought to admonish miners everywhere to look after and defeat these fraudulent transactions. Heretofore mining interests have been clogged in this county by defective titles, but such difficulties have been removed in most cases, especially with the Mariposa grant, covering 49,000 acres, and now good titles can be given.

Mono.

Concerning mining matters in Bodie, the principal camp in this county during the past year, the Bodie *Miner* remarks as follows:

Although Bodie district has not been so prosperous during the year 1886 as in some previous years of the decade just closed, still it has not been so bad as it might have been, or as was predicted by some of the old croakers at the beginning of the year.

Of the 130 stamps, belonging to the district, the Standard Con. has kept 15 running throughout the year. The Bodie tunnel employed 15 stamps five months; the Bodie and Mono 10 stamps four and a half months; the Bulwer Con. 15 stamps three and a half months; the Con. Pacific 4 stamps 10 days. John Wagner's tailings mill was employed about four months during the year. The Noonday mill, with 40 stamps, the Spaulding with 10, and the Syndicate with 15, were closed down during the entire year. The old Standard was run some on tailings.

When we take into consideration the idleness on the part of so many of our mines and mills, and the limited number of men who have been employed in the mines of the district during the year, the showing is not a very bad one for a camp that has had the bottom so completely knocked out of it by the pessimists as has Bodie. This district is not dead yet.

The following table shows the total amount shipped from each source from 1876 to Dec. 31, 1886:

Standard Con.	\$10,446,270 03
Bodie Con.	4,046,743 33
Noonday	1,023,289 50
Syndicate	554,711 21
Bulwer	428,738 77
Bechtel Con.	206,530 87
Bodie Tunnel	219,804 72
Wagner's Tailings Mills	50,500 61
Belvidere	25,901 26
Virginia Creek Hydraulic	21,300 00
New Standard	17,714 76
Oro	14,155 66
Mono	132,868 08
Concordia	5,670 33
Mexican, Red Cloud and Kate Rogers	12,500 00
Sitting Bull	3,485 00
Red Cloud	1,927 50
Dudley	1,746 06
Boston Con.	1,331 00
Shipments by banks	112,937 00
Scattering shipments	312,394 83
Con. Pacific	1,530 52
Total	\$17,661,599 18

The following table gives the total shipment

from this district each year, from 1876 to Dec. 31, 1886:

1877	\$ 797,022 80	1882	\$3,217,780 24
1878	2,129,732 58	1883	1,562,067 08
1879	2,576,837 58	1884	1,144,883 96
1880	3,063,699 13	1885	449,765 95
1881	3,172,754 71	1886	520,455 15

Total.....\$17,661,599 18

It will be seen by the above that the shipments for 1886 amounted to \$76,589.20 more than for 1885.

Of the above production of over seventeen and a half millions of dollars, the following amounts have been disbursed as dividends to the stockholders by the companies named:

Standard Con.	\$4,425,000
Bodie Con.	1,695,000
Bulwer Con.	175,000
Syndicate	80,000
Mono	12,500

Total.....\$6,387,500

Nevada

Continues to hold the position which she has always enjoyed of being the banner gold-mining county of the State. Being the site of the principal hydraulic operations, the closing of this class of mines has largely diminished the output of gold from that source; still the annual product of gold is kept up to the normal standard of late years—about \$3,000,000—this being due to the increased yield of the quartz and drift mines.

Concerning the condition and prospects of the mining interest in this county during the past year, we copy this following from the *San Francisco Chronicle*, being an article prepared for the annual edition of that paper by the editor of the *Nevada City Transcript*:

The litigation so vigorously prosecuted for several years past by the people of the Sacramento valley to compel the cessation of hydraulic mining in this part of the State because of injury wrought to the lowlands by sending down upon them the debris that results from this method of gold mining, for a time seriously retarded Nevada county's progress by throwing out of employment hundreds of well-paid laboring men, many of whom were compelled to go elsewhere in search of situations whereby they might earn a livelihood. But the county's resources are too abundant and varied to permit of the suppression of even so important a branch as hydraulic mining resulting in irreparable damage. Her quartz and drift-mining enterprises have received added attention, never before being as energetically and successfully prosecuted as now. Nevada City and Grass Valley, which towns are but four miles separated, and contain a population of some 13,000 people about equally divided between them, are the center of a region whose richness as a gold-producing district is equalled by its horticultural and agricultural productiveness. The Providence, Wyoming, Nevada City, Idaho, North Star, Empire and other veteran quartz claims that have for years been producing mineral wealth, continue to give forth an unflinching stream of riches, and new producers are at satisfactorily frequent intervals being added to the list and helping to swell the total output. These two towns are, beyond doubt, immediately surrounded by the most productive and permanent gold fields of the country. With one or two exceptions, the mines are under the control of "close corporations," and it is impossible for outsiders to obtain any information as to their profits; but it is plainly discernible that the most of them are paying largely.

Washington district, about 20 miles in a northeasterly direction from the county seat, continues to prosper. The Yuba, Eagle Bird, Spanish and other large quartz mines there are being worked with the best results. It is but a few years since quartz mining was systematically prosecuted there, and now the yield of bullion is large and regular. The quartz-mining outlook in the vicinity of Graniteville is also improving. The revival of operations last summer at Meadow Lake district has not yet led to any substantial returns, but the experiments made with a view to ready and cheap reduction of the refractory ore by aid of electricity give every promise of accomplishing the desired end in good time. The gold is undoubtedly present in the ore in paying quantities, but how to separate it from the base matter in which nature has locked it has long been the stumbling-block to scientists and metallurgists.

The Derbec and Mahel drift mines at North Bloomfield are yielding well and give lucrative employment to many men.

Placer.

Placer, which adjoins Nevada county on the southeast, though not, like her neighbor, a banner gold-producer, belongs, nevertheless, to the "old guard," having an honorable record reaching back to pioneer days. While quartz mining reaches here very respectable dimensions, being actively prosecuted in the vicinity of Newcastle, Auburn and Colfax, it is subordinate to drift mining, as it was also to hydraulic mining when this industry was enured to be carried on here. Drift operations in Placer are conducted on a large scale, this county contesting with Sierra for supremacy in this branch of mining. As the Colfax divide is the theater of the principal quartz-mining operations, as it was also formerly of the largest hydraulic washings, so is the Forest Hill divide, the site of the most important drift operations, which extend along the ridge for a distance of 15 or 20 miles, Iowa Hill, Forest Hill, Bath and Damascus constituting their chief centers.

Plumas.

This is another county of mixed mining industries, quartz at the present day, however, largely predominating. More than two-thirds of Plumas lie in or beyond the high Sierra, a position that places the portions of it so situated to some disadvantage, both as regards accessibility and climatic conditions. As a consequence, the mining industry has in that section been somewhat retarded, notwithstanding its large mineral resources. The Plumas-Eureka Company, whose mine is located in the southern part of the county, have been running their 60-stamp mill steadily throughout the year, making their usual production of bullion, which amounts annually to about \$250,000. They employ 200 hands and have their mine well opened with a good stock of medium-grade ore in sight. Among other vein mines that have been extensively developed and are being profitably worked here are the Green Mountain, the Miller, Gencese, Arcadian, Lucky, Indian, Granite Basin, etc.

These mines are also supplied with mills, there being beside a number of arrastras run in the county. Some of the richest and most promising quartz veins in Plumas are located in the vicinity of Eagle gulch, about 12 miles from Quincy, the county seat. Although but little has heretofore been heard of this district, its solid merits are beginning to attract attention, the agents of one of our mining magnates having lately been examining some of the mines there with a view to investing in them.

A good deal of drift mining is also being carried on in Plumas, the sites of these operations being mostly along the north fork of Feather river and its tributaries. Some gulch washing and ground sluicing are also done in different parts of the county during the wet season.

San Bernardino

Has within the past few years been brought to the front as a mining county, the Calico silver-producing region, located near the center of the county, having given it prominence in this respect. There are also gold mines, both placer and quartz, in various parts of San Bernardino, Holcombe valley being the most important placer-mining center in the county. In this valley are found extensive bodies of rich hydraulic gravel some of which are about to be worked on a large scale, an English company having made preparations to that end.

The value of the silver turned out in this county, the most of it coming from the Calico country, amounted last year to about \$3,000,000, a product that, it is believed, can be kept up and even increased for many years to come, now that improved methods for treating the low-grade and refractory ores there have been brought into use. Among these methods the leaching process is the most prominent, constituting, in fact, a new departure in that country.

Through the introduction of this plan and other improvements lately effected, the mining properties of Calico and the silver-producing districts adjacent have been greatly improved.

San Diego.

Touching the mining interests and industries of San Diego, it may be remarked that quartz is the principal branch of mining carried on in that county, the Julian district being the chief center of the business. Many old mines are now being successfully worked. The Rsady Relief mine, 10-stamp mill, turns out \$26,000 per month. The Owens mine pays \$15,000 to \$20,000 per month. The old Stonewall mine has yielded about \$130,000 the past year. A number of other mines are being worked with profit.

Shasta

Has within the past few years come to be a very live sort of mining county, the quartz industry, as the placer diggings gave out, having received a great impetus. As evidence of the waking-up that Shasta has experienced, and the progress that mining has made there lately, we quote as follows from a local paper:

No vocation or industry has received such an impetus or been so lucrative and of permanent benefit to Shasta as mining. All her other resources have not added as much wealth to the county as mining has in the past 15 months, or put as much money in circulation. We assert that these statements are easy of proof. Being familiar with nearly all the mining sales that have been consummated within the period of time mentioned, we are able to safely say that the sum total invested in the purchase of mining property in this county, including Deadwood, will foot up not less than \$300,000, and if anything, beyond that figure. Add to this \$250,000 invested in new mining machinery, and the thousands of dollars expended in developments, and the actual cash value of good mining property that has been opened, and the gold bullion produced in the past 15 months, and we have an increase in wealth from this industry alone, that when seriously contemplated is astonishing and surprisingly large.

Sierra.

No mining county in the State has during the past few years so forged ahead as Sierra. In every department of the business, save hydraulic washing, here also suppressed, she has made rapid and solid progress. In quartz mining she has notably distinguished herself, some especially promising mines having lately been developed here, the Young America eclipsing anything recently brought out. It is reported that they have now opened up in this mine an ore body 900 feet long and six feet wide that

will mill \$30 per ton. This is a bonanza, and if it hold even to a moderate depth must give great value to this property, which with a small number of stamps continues to make an average monthly production of about \$30,000. The Sierra Buttes mine in the same locality has kept its 110 stamps steadily dropping on ore the year through, making its accustomed large output of gold bullion, an outlook that may be looked upon as assured for many years to come. The Alaska and a dozen other standard mines in Sierra have also been running with good results. Some new mineral developments of importance are also announced in this county. While the most of these have been made in the northern and more central parts of the county, others of great promise have occurred on its southern border, these latter strikes being in the Sunrise and the Oscola mines already alluded to.

Sierra has from the first been conspicuous as a drift-mining county, this being the site of the famous Bald Mountain, and of the now hardly less famous Bald Mountain Extension claims, the latter having come into bonanza as the former went out. The original Bald Mountain ground, without being yet exhausted, has, after yielding nearly \$3,000,000, suffered such impoverishment that it returns now but small net earnings. The claim of the Extension Company is, however, yielding largely, the owners for some time past having been in the receipt of liberal dividends. There are many other drift claims in the county that are being worked with great profit, not to mention the much larger number that are paying at least fair wages.

Siskiyou

County, though most noted for its hydraulic and river-bed operations carried on chiefly along the Klamath and its branches, possesses, at the same time, great resources in quartz, an element that is destined to add immensely to its prosperity, notwithstanding it has, up to this time, been greatly overlooked. Such neglect of vein mining in Siskiyou has been due mainly to the fact that this county has, until recently, been difficult of approach, long wagon transportation over mountain roads having rendered the conveyance of machinery tedious and costly. Then, too, the exceeding richness of the placer deposits have tended to delay the advent of vein mining, the early population being abundantly satisfied with the yield of the former. But now all this is changed; the placers are pretty well depleted, and the railroad having arrived in this border county, places it in easy communication with San Francisco, rendering the importation of machinery and all other needed supplies cheap and speedy. With this there comes a revolution bringing the rich quartz mines of Siskiyou into requisition and insuring for the county greater progress and a more permanent prosperity. Already the prospector is abroad; the expert has put in an appearance; new mines are being located and work started on the old ones, the outlook for this county being flattering indeed.

Trinity.

Besides a great extent of placer and hydraulic deposits, Trinity contains many valuable quartz veins, the most active and promising localities in this department of mining being the Deadwood, Bullychoop and the New River districts, in all of which mills are running and many fine mines are being worked or opened. Hydraulic mining is also prosecuted largely and profitably, it having here met with no protest or complaint.

Tulumbne.

Mining, after being for a long time much depressed in Tulumbne, has lately undergone there a manifest improvement, especially along the Soulesby quartz belt, lying to the east of Sonora, as well as along the mother lode, which strikes centrally across the county. There is at the present day but little mining other than quartz carried on in Tulumbne, but with this latter industry so restored the mining outlook for the county may be considered good.

Yuba.

The cessation of hydraulic operations, once very extensive in Yuba, leaves the mining industry of this county so emasculated that not much remains. There are a few quartz mines being worked here, some of which are yielding well. Some exploratory work is also being done on others, and it may be that this branch of mining will yet grow into importance in this ancient but lately unfortunate mining locality.

There are a dozen other counties in this State containing mineral deposits of various kinds, such as iron, copper, lead, antimony, quicksilver, etc. Some of these are also quite rich in the precious metals, but their store of these is yet limited.

Minerals.

The principal receipts of minerals at San Francisco during each month of the past year were as follows:

MONTHS.	Quick-silver, Flasks.	Lead, Lbs.	Borax, Ctl.
January.....	1,872	49,950	5,794
February.....	1,209	27,000	4,809
March.....	2,223	11,000	6,015
April.....	1,035	.....	3,643
May.....	1,335	.....	8,151
June.....	1,672	.....	5,255
July.....	1,257	6,300	5,169
August.....	1,413	2,400	5,065
September.....	1,090	300	6,407
October.....	994	.....	7,010
November.....	1,655	740	10,515
December.....	1,405	1,100	6,787
Totals 1886.....	17,320	98,850	77,929

From the above table it appears that 12,161

asks of quicksilver having been shipped direct to points of consumption, failed to be reported at San Francisco.

About two-thirds of the borax produced on this coast comes from the salines of California; the balance from those in Nevada. According to the estimates, the quantity of this salt made last year was less by some 2,000,000 pounds than the quantity made the year before.

Copper Mining in California.

For the reasons that have tended to curtail copper mining elsewhere, the business has of late years shrunk to comparatively small dimensions in California, both as regards reduction and shipment of ore. The production of metal does not now exceed 800 tons of cement per year, little or no ore being exported from the State. About 500 tons of the above product comes from the mines of the San Francisco Company at Spenceville, Nevada county. The method of procedure here is by roasting the ore in open piles, leaching the sulphate formed and precipitating by scrap iron, the precipitates obtained assaying between 85 and 90 percent copper. The balance of the copper produced in California is turned out mostly from the several small mines situated in the vicinity of Campo Seco, Calaveras county, the process in use here being similar to that employed at Spenceville, except that the roasting is done in furnaces. A smelter was also in use here at one time, but it has not been running of late. With some improvement in the price of this metal, copper mining would be revived in California, as we have medium-grade ore here in great abundance, while our facilities for mining and handling the same are superior to those enjoyed by our neighbors.

The business of prospecting for and producing petroleum was prosecuted in California last year at several points with great energy and generally good results. This business has, in fact, developed here into a great and permanent industry, the quantity of crude petroleum raised last year having amounted to 11,000,000 gallons, part of which was refined, part used as fuel and the rest as a lubricator.

The price of oil fell four to five cents per gallon. Great developments are expected during the present year. Nearly one-half that used for illuminating purposes on the coast in 1886 is said to have been California oil.

The salt crop of this State, the most of which is made at the works on the Alameda shore of the bay, fell off last year to the extent of several thousand tons, a result due chiefly to the unfavorable climatic conditions of the season. The year's product is estimated at 27,000 tons. The price of this article continues low and importations limited.

NEVADA.

The State of Nevada, for many years at the head of the list of bullion-producing States, is now eclipsed by Colorado and California, but her product is by no means insignificant. People, since the bonanza days of marvelous richness have passed, have come to look upon the Comstock as a thing of the past. This is by no means the case. Several of the mines are producing as much bullion monthly as would make the reputation of a new territory. There are not very many mining camps that eclipse it now. Leadville, in Colorado, and Butte, in Montana, are now the leading camps. The Comstock is still turning out its thousands every month, however, and bids fair to do so for a long time. They are good miners up in that region, and good metallurgists, and they are bending all their energies to accomplish the successful working of low-grade ores, of which the old lode can yield hundreds of thousands of tons.

The recent revival of mining affairs on the Comstock, and the increased yield of the old bonanza mines—Con. California and Virginia—is still fresh in the minds of the public. The resulting mining-stock excitement has not yet subsided. Many old mines not worked for years have been started up, and vigorous prospecting is being carried on in every direction. Now that the lower levels have been given up to the water, they are working out ore above that was passed in more prosperous days. There is something like 30,000 tons of ore a month worked in the Comstock mills, and the resultant bullion has a large proportion of gold. Experiments in various directions for saving expense are now being conducted, and the old lode may yet give an account of itself which will surprise many. In the days of "bonanzas" on the Comstock, \$50-ore was said to be worthless. Improved machinery and the thorough understanding of mining has changed matters to such an extent that \$15-ore in a body is good.

In Nye county the mining outlook for this year is decidedly encouraging. The Belmont Courier says that at Spanish Belt the Barcelona mine gives promise of continuing to produce extensive quantities of rich ore. This ore, when extracted, is shipped to Eureka or some other point for reduction. All who have worked in the Barcelona pronounce it one of the greatest undeveloped mining properties on the Pacific Slope. It will be opened in a thorough and systematic manner some time in the near future. In the mines of East Belmont a resumption of work is probable, and as they have all been bullion-producers, good results may reasonably be expected. Jefferson district will soon awaken from its lethargy. The principal mine there—the Jefferson—has passed into the hands of Superintendent T. A. Oliver, of the Chicago Mining and Reduction

Company of Ophir Canyon. Years ago the Jefferson paid dividends to its stockholders, and will do so again when worked as a business proposition. Mr. Oliver has secured a valuable mine. The mines of San Antonio are being worked and shipments of ore will be made during the year. At Ophir the promise for a busy year is strong, and increased bullion shipments are almost certain to gladden the hearts of the stockholders of the Chicago Mining and Reduction Company. Lodi also gives promise of becoming a bullion-producing and prosperous camp again. It is expected that work will be resumed in the leading mines there early this spring. Those who have pinned their faith to the mines of Ellsworth say that work will soon be resumed in that once lively burg. Downeyville is still in the ring and will be heard from in the early spring. Tybo will surprise the oldest inhabitant by the extent of its bullion shipments, and its liveliest days of the past will be considered but a circumstance compared with those that are to come. Reveille will also continue to yield its rich ore to the patient efforts of those who have stayed with its mines. In Mantattan district an English company will work some valuable mines. Grantsville, too, and Ione will be added to the list of bullion-producers, and then will set in an era of prosperity that will astonish the worst croaker ever seen in the county of Nye.

Outside of the Comstock the region down along the Carson & Colorado railroad has many camps with good prospects. Many of these, says the Walker Lake Bulletin, are becoming producing camps. Large quantities of rich ore are now shipped from Santa Fe, and in Moss district, within a few days, new discoveries of rich gold-bearing quartz have been made.

Garfield district is still improving and has enough in sight to assure a steady output for a long time. Hawthorne district, in which is situated the Lapanta, never had so brilliant an outlook. The Lapanta, steadily improving, is now one of the most valuable gold mines on the coast, and exhibits enough ore in its reserves to guarantee years of profitable working. The North Star Consolidated Company has developed a mine which is attracting attention from all directions. Coryville has a future before it now which will eclipse its first boom. The ledge now uncovered is there to stay and a large addition to the bullion product will come from this, the pleasantest place on the coast for a mining camp. Palmetto and Silver Peak are beginning to be looked upon as lively camps, and Candelaria will soon be again one of the liveliest mining camps on the coast.

From the Esmeralda News, a new journal, we take several items relating to Nevada camps: The Silver King mining district is 25 miles in a southwesterly direction from Hawthorne. Levi Smith is the owner of a very promising silver mine in this district named the Oriole. The ore is of average grade and in large, extensive bodies. Considerable work has been done on this mine.

The Tiger ledge, owned by Tom Purcell, is from eight to ten inches wide, and its average value per ton is \$50, exclusively gold.

The prospects are that there will be plenty of employment for laborers very soon. The mines of Columbus district never were more promising. There is plenty of good ore in sight in the Holmes, Diablo and Georgene mines. The new mill, at Candelaria, is running on ore from the latter, while the Holmes and Diablo have all their outlets filled to the utmost of the best character of pay ore. The Diablo company is now erecting a 10-stamp mill at Sodaville.

Work on a small scale has been resumed on several of the mines of Marietta district, and the chloriders are extracting therefrom some very rich ore which will soon be shipped for reduction. There is a good 10-stamp mill there in close proximity to the mines and only 10 miles distant from the Carson & Colorado railroad, at the town of Belleville.

The Lake View mining district extends north of the Mount Cory district and west of Walker lake, which includes the mines situated near the top of Mount Grant. In 1877 the General Grant Mining Company, a corporation, owned and operated mines in this district, but owing to the lack of cheap transportation and disagreement between the stockholders and managers of the company they suspended work. Since that time the railroad has been built and it is rumored that this company will soon resume operations.

Moss district is in the Gillis range of mountains on the north of the railroad line. Gold was first discovered therein in 1883, which was taken from the Sierra mine, a parallel claim to the Montreal, owned by Joshua Moss, from whence the district derives its name. The Sierra ledge is small and may be more properly considered a specimen mine, from the fact that it has produced the finest specimens of gold quartz. The Cumberland mine, in this district, is situated about six miles from the Kinkead mill. The ledge is flat and varying from 10 to 12 inches in thickness. Very little work has been performed on this claim, owing to the fact of its being a very recent discovery.

The Montreal has furnished a considerable quantity of rich gold ore which has been worked in the Kinkead mill.

Alex. Morrison and John Warner have leased the Toronto mine from Joshua Moss, its owner. There was no ore in sight at the time they began work, but on sinking at a depth of 20 feet they encountered a ledge of very rich gold ore, 12 inches thick, and continued sinking thereon to a depth of 75 feet, from which point they

ran a drift south about 30 feet. They have between 25 and 30 tons of fine ore on the dump, valued at \$100 per ton, which they contemplate shipping to the Reno Reduction Works. This mine is within two miles of the railroad at the Kinkead mill.

The Garfield mining district adjoins Hawthorne district on the east, and is about 12 miles from the line of the Carson & Colorado railroad at Sodaville. The Garfield Mining Company, Limited, employs about 50 men and is working the Western, Atherton, Lancashire, Manchester and Ahs Lincoln mines, taking therefrom between 20 and 30 tons daily of rich ore. The Garfield mill is 10 miles distant from the mines and is kept constantly running on this ore.

The Hinley mine, which is an extension of the Western, employs 12 men, who take out daily about nine tons of ore which runs up into the hundreds of dollars to the ton. Teams are kept busy hauling this ore to Hawthorne, where it is shipped on the Carson & Colorado railroad to Dayton and the Reno Reduction Works for reduction. They have an enormous quantity of low-grade ore on the dumps.

In southern Esmeralda the mining outlook has not been so bright for many years. At Old Camp, in Gold Mountain district, are more men, greater industry and enterprise, and better developments being made than in any district south of Silver Peak. During the last summer, B. F. Leete, of Reno, secured a number of mines, and has a mill there, almost completed, for the reduction of his ore, which is chiefly gold-bearing. The owner will also do custom work, thus affording chloriders and tributaries an opportunity of realizing on their labor.

A. P. Anderson is the only hullivan-producer as yet in the district. His steam arrastras have all the work they can do.

At Lida Valley district few claims are being worked, among which is the Death Valley mine, by Keiser & Tracy, who crush their ore at R. H. Stuart's five-stamp mill. Louie Teyhen & Co. are having work done. The latter made a shipment of ore to San Francisco recently that yielded \$180 gold per ton, the largest percentage of gold ever taken from this mine. There is much confidence expressed that two New York companies that own valuable mines in that district will very soon commence active work upon their properties.

The Mount Diablo Mill and Mining Co. having decided to build a mill at Sodaville, on the line of the railroad, some 20 miles from its mine, is pushing the work with vigor. The mill is to be of 10 stamps, with a plain cylinder roasting furnace, six pans and three settlers. The company expects to have the mill ready to crush ore before the first of April next. Through the use of its new mill, the Mount Diablo will save five dollars per ton on its ore, and its output will be entirely free from interruptions.

Aurora, which showed signs of great advancement last year, is again under a cloud, caused by the closing of the mines owned by the English company. However, the dull times are only temporary, as the Silver Lining will soon begin producing hullivan, and there is no doubt that the English company will resume operations in a short time. Although Aurora has frequent spells of business depression, the people never get discouraged.

John Centras, owner of the Centras mines, near Grantsville, Western Nye county, is endeavoring to make arrangements to have 1000 tons of ore from his mine worked at the mill being repaired by the new company at Knickerbocker Canyon.

In Northern Lander, according to the *Central Nevada*, the prospects are bright. Rich discoveries are being made in Galena, Lewis and Old Battle Mountain, as the work of development progresses, and the ore product warrants the opinion that those places are deposits of wealth. That there are mines in either of those places that would produce enough ore to keep in operation extensive reduction works is no longer a matter of speculation, but an assured fact. In Lewis, the Pittsburg Gold Mines have in the last two years produced nearly \$200,000 in gold bullion, with two little Huntington crushers in the mill; while other mines in the same locality would do nearly as well if they had the facilities for reducing their ores. The Humming mines at Galena have produced a large amount of hullivan, and yet have in sight thousands of tons of gold ore, that can be reduced for \$4 per ton. Other mines there have shipped large quantities of rich ore to Reno and Selt Lake for reduction that, notwithstanding the high freight, yielded a handsome profit to their owners. With such great inducement for investment, capitalists will not long stand aloof, but will avail themselves of the opportunities offered them here to invest their money in legitimate mining, that will by honest management pay handsome dividends to the investors.

In Eureka district the Eureka Consolidated is turning out the usual quantity of ore. The furnace and refinery are running well and producing bullion.

A Hamilton (White Pine county) correspondent, writing to the *Eureka Sentinel*, says: "The mining outlook in this part of the county is very encouraging, and by spring the Sweetwater Company will have ore in the orehouse at the Stafford and Wheeler tunnel sufficient to keep their mill pounding away for months. The Percell mine on White Pine mountain is showing up finely, and it is the intention of Eugene N. Robinson, Managing Director of the Sweetwater Co., to put up concentrators, and will erect a 60-ton furnace this spring. Mr. Robin-

son is now on his way to London, where he is to meet capitalists who desire to become interested with him in mining in this State. He has bonded the Cortez mine from Mr. Wenhan for a large figure."

At White Pine they are experimenting on treating the low-grade ores by the pan process without the aid of chloridizing furnaces. It is said they have demonstrated the success of the process. It is a well known fact that immense bodies of low-grade silver ore lie exposed in and about Treasure Hill, and the question has long been agitated by mining men as to whether these ores could be handled so as to pay a profit over and above the cost of mining and milling. In early days rock from such mines as the Hidden Treasure, Eberhardt and Aurora, Ward Beecher, Silver Wave and others, assaying on an average \$50 in silver per ton and over, did not appear to distribute much money in the form of dividends to shareholders, as these ores were seldom if ever worked above 76 per cent, and in many cases not to exceed 50 per cent of the assay value was extracted; the tailings, after leaving the mills, assaying from \$20 to \$25 per ton. The Eberhardt mill worked something like 100,000 tons of ore, the tailings from which, before being reworked, assayed on an average \$13 per ton. At the time this milling was done it was considered good close work, as much of the ore was extremely refractory, carrying a high percentage of manganese, antimony and sulphides of silver, which combination all practical millmen know to be difficult to amalgamate with mercury. Samples of the most refractory ores from the mines of Treasures Hill were worked in the Smokey mill last season with success, the tailings denoting a working percentage of from 87 to 95 per cent on all grades of ore.

At Pioche a leaching plant of 60 tons per day has been built. These works were constructed principally from the waste pile at Bullionville, the refuse of contractors who erected works at that place.

ARIZONA.

Arizona is not as prosperous a mining region as it ought to be. The protracted Indian troubles frightened away Eastern investors and drove miners from the camps. Prospecting ceased in certain portions of the Territory for the same reason. Still these troubles have all ceased and the whole Territory is as peaceful as any part of the Union. There are plenty of good mines, and a number of districts, but unfortunately the people there have no capital, and capital does not come. The leading Tombstone mines, after paying a large amount in dividends, reached water level, requiring expensive pumping machinery, and have since been involved in disputes among themselves regarding the proportion of pumping expenses which each is to bear. There seems to be no immediate prospect of a resumption of work, and meantime Tombstone is not the lively camp it once was. Much was expected from the Quijota mines in Pima county, to which place there was a big rush three years ago. A mile of stores—some of them expensive buildings—were built up in three months, town lots sold as high as \$1000 and a newspaper was started, but the mines have not panned out as was hoped. Other mining ventures met with little better success. In some instances mills were built where there was no mine, in others, the ore gave out at a moderate depth, while frequently, where the mine and mill were both first-class, some cousin of an Eastern stockholder who had learned mining in a stockbroker's office, would be sent to "manage" the enterprise, resulting, of course, in an early discovery that the mine was no good.

Still, as our weekly mining summary shows, a good many men are at work in the various camps and getting along as best they can without the aid of capital. The country is full of mineral. Some of the best copper mines in the Union are in Arizona. The low price of the metal and the advantages of transportation possessed by Michigan and Montana have been disastrous to Arizona's copper interests. The mines are just as good as ever, though, and will be worked with renewed vigor when the price of copper warrants it. The class of ores at Bisbee and thereabout is such as to admit of very cheap and perfect smelting. There are many gold and silver-mining enterprises now under way in the Territory which promise great results. People can buy good claims there now for much less money than in most other mining regions; and when a "boom" sets in the direction of Arizona once more, those who have waited will realize their reward.

The Arizona *Silver Belt* in speaking of the situation in the Territory says: There is much in the situation that is hopeful, and while Arizona has, from obvious reasons, thus far failed to gain that recognition which her great mineral wealth rightly entitles her to, yet there are abundant signs that we are to share with our sister Territories in the approaching prosperity. But while the situation holds much of promise, nevertheless there are features about it—probably inseparable from mining home—that are ominous, namely, the purchase of worthless properties, the stocking of mines far beyond their intrinsic value and incompetent management. These are the causes which in the past hindered the progress of mining and again threaten to check its rise. There is, apparently, a craze on with the public to buy mining stocks of any and every description, not alone by wealthy individuals, but also by people of limited means, who are not content until their savings have gone into mining shares, of the real

value of which they are, in a large majority of cases, entirely ignorant. St. Louis furnishes the most striking example of this mania. Three or four years ago mining men would have as soon thought of looking in the moon for purchasers of their mines as to St. Louis. Now no prospect hole is so insignificant but what a purchaser can be found for it there. There are many legitimate mining projects that have been and others that will, in the near future, be set on foot by men of honest purpose who will carry into mining the same sound and sagacious principles by which they attained success in other pursuits. Such men the West wants; men who look upon mining not as a speculation but as a legitimate business, requiring the same intelligent and common-sense management as is necessary to success in any mercantile pursuit.

But those men who purchase undeveloped claims for a few thousand dollars and float them on an unsuspecting and credulous public for 10 times their cost, are greater criminals than the defaulting bank cashier or the highway robber, and should be so considered in the eyes of the law. There is not one chance in a thousand for the success of such wild projects, as their originators well know, and when failure comes and the stockholders' money is swallowed up, the West must hear the burden and curse and mining be denounced as a rank speculation. These dupes of the fine-haired gentlemen who have lined their own pockets, seldom think of accusing them of dishonesty, but they are, in nearly every instance, responsible for the failure, and who, if justice were meted out, would change their residence from the aristocratic mansion to the penitentiary. We need not go away from home for such examples of failure altogether chargeable to gross incompetency and reckless expenditure. All about us are the mute evidences of failure; partially developed claims abandoned; mills and smelters idle and decaying. Here a company that bought a worthless prospect for \$10,000 and erected a \$100,000 mill; there a mine that is known to be valuable but mismanagement has injured the property, bankrupted the company, disgusted the stockholders; another company with a promising claim, by the advice of an impracticable superintendent, has purchased expensive machinery not adapted for the reduction of their ore. Such cases are part of the history of many districts and of almost all the best camps. Fortunately the repetition of these egregious errors becomes less frequent every year with the growth of mining, the wider dissemination of practical knowledge and the improvement and cheapening of methods for treating ores.

One thing we can reasonably certain of, and that is the early development of Arizona's mineral resources. The Indian question has been permanently settled by the removal of the Chiricahuas from the Territory. Railroads are being built which will open rich mining districts hitherto little known, cheapen the cost of supplies and give an impetus to every kind of business.

COLORADO.

The State of Colorado still leads in bullion product, as the figures given in another column show. The total output for the year was the greatest known. In the old districts, as well as in those which are, comparatively speaking, new, there was increased activity. The output of Gilpin, the great gold producing county, was the greatest it has made for the past 16 years. Leadville awakened to new life and asserted itself in such a way as to convince even the worst of its enemies that their prophecies of evil regarding it were false. In Aspen there was not a great deal of work done, owing to the fact that injunctions had been issued against the working of several of the mines, and also because mine-owners preferred to wait until the arrival of the railroads. But it has been shown beyond any question that the mines of Aspen Mountain are wonderfully rich, and as soon as the shipping of ore is renewed there will be a boom in Aspen such as has not been seen in Colorado since the Gunnison stampede of 1880.

Red Cliff also moved forward as a producer, the wonderful mineral caves in the quartzite having proved to be very rich. In the San Juan, and particularly in the Red Mountain and Silverton districts, there was great activity.

A Leadville special to the *News* says the production of Lake county for 1886 shows a total yield for the year of \$13,750,733, being a gain over last year of \$1,500,000. During the year the Leadville district sent into the marts of the United States 48,488 tons of lead, 8,166,145 ounces of silver, 36,546 ounces of gold, and 138,535 tons of ore. The value of the base hullivan produced was \$7,515,148, and that of ore, etc., \$6,135,585.

The Denver *Tribune-Republican* says: To obtain accurate figures of the hullivan yield of our mines at the close of each year is a matter of impossibility, because the smelters cannot then furnish such statistics in complete form. Clooe estimates have been received from most of the smelters and hullivan-buyers of the State, and aggregate as follows: Silver, \$16,450,921; lead, \$5,123,296; gold, \$5,087,901; copper, \$132,570; making a grand total of \$26,794,688, as the yield of the mines of Colorado for 1886. This is an increase of \$4,294,688 over the figures given by us for 1885, and of \$2,362,080 over the revised figures published by the Director of the Mint in May last. That there should be any increase is a matter of moment, in view of the fact that silver has averaged six cents lower per ounce than in 1885, which represents a loss of \$977,-

184.72. To this loss should be added the almost entire suspension of hullivan shipment from Aspen and the curtailment of ore shipments from the vast treasure vaults of Pitkin county. This would represent another million dollars of loss or nearly two million dollars shrinkage from these two sources. To offset this, however, lead has ruled \$12 higher per ton in 1886, or a gain in value of \$668,256 on the 55,688 tons of lead produced the past year. Lake county has shown an increase in value of product of over \$1,000,000, while Eagle, Summit, Chaffee, Clear Creek, Gilpin and the San Juan counties have also largely augmented their product of the precious metals. The official figures procurable several months hence will, it is believed, not materially differ from those now given by the *Republican*.

The Pueblo Smelter, with 13 stacks, ran the first part of the year with 10 stacks, and the latter part of the year with only four. The Colorado Smelter, at Pueblo, with four stacks, has run pretty fully all the year. The Massachusetts Smelter, also at Pueblo, has been idle since last spring, and did but little during the early part of the year.

The Royal George Smelter, at Canyon City, had its two stacks in blast the most of the year. The copper smelter at Canyon City made but two runs and closed down.

The Golden Smelter, at Golden City, with two stacks, has run pretty constantly all the year.

At Gunnison there are three smelting plants, but the Tomichi Smelter, with two stacks, is the only one which has done any business of account, and it has run fairly constantly since early last summer.

At Rico the Pasadena ran a few months during the year, and Durango's San Juan and New York, with two stacks, has run pretty constantly during the year. The smelter at Aspen made but one short run.

Denver has made more progress in smelting than any other point in the State. The McNair and Bailey establishments closed early in the year. The Argo works have run constantly, though have made no effort to run to their full capacity. Their product was as follows:

Locality.	Gold.	Silver.	Copper.	Total.
Boulder.....	\$ 81,200	\$ 2,950	\$	\$ 112,150
Clear Creek.....	93,000	230,000	14,300	337,300
Gilpin.....	175,000	50,500	25,000	250,500
Gunnison.....	20,200	20,200	20,200	60,600
Hustada.....	1,000	3,200	2,500	6,700
Lake.....	122,000	.....	.....	122,000
Ouray.....	3,400	70,000	1,250	74,650
Park.....	5,000	49,500	500	55,000
Summit.....	145,000	120	145,120	145,120
Saguache.....	50,000	3,000	25,300	78,300
Arizona.....	10,075	4,600	14,675	14,675
California.....	5,000	17,000	700	22,700
Montana.....	53,000	514,000	245,000	812,000
Mexico.....	4,500	50,000	3,000	64,500
Nevada.....	57,000	251,000	6,000	314,000
New Mexico.....	15,000	22,000	4,675	41,675
Utah.....	23,200	122,000	40,500	191,700
Miscellaneous.....	292,000	711,000	55,500	1,061,500
Totals.....	\$827,300	\$2,410,555	\$413,115	\$3,651,000

The Omaha & Grant, with nine stacks, have run almost constantly and produced a total value of \$8,053,143, of which \$3,275,901 was from ore produced outside of the State.

The output of Georgetown, according to the *Courier*, was \$1,200,000 for 1886. That paper says: Sufficient is known to justify the assertion that the eastern end of the county has held its own, and there are grounds for the belief that on the whole the county's production has naturally increased. The figures obtained from the sampling works in Georgetown are reliable. What the buyers of Idaho Springs handled is not known. Another difficulty is to ascertain the amount of ore shipped direct from the mines to Denver and other points. A number of our best-informed men think that \$100,000 would be a low estimate for the amount so shipped from Georgetown. The amount of ore shipped from Lawson is not known, nor is that considerable item, the gold from the placers. Following is the value of ore purchased by the three Georgetown works:

Miners Works.....	3,204 tons	\$923,542 33
Hall & Co.....	3,449,134 lbs.	359,854 00
Public Ore Market.....	3,813 tons	424,738 40

Independent shippers (est.).. \$1,168,134 73

Total value .. \$1,208,134 73

GRANT SMELTER.

The product of the Grant smelter, from Colorado ores only, has been as follows:

Silver.....	2,772,939 ozs.	\$2,745,209 61
Gold.....	57,121 ozs.	1,176,932 60
Lead.....	8,645 tons	39,777 00
Copper.....	300 tons	60,000 00

Total value .. \$4,021,679 21

HOLDEN SMELTER.

The Holden smelter has been in operation but three months, during which time it produced:

Silver.....	335,274 ozs.	\$335,274 00
Gold.....	1,567 ozs.	1,567 00
Lead.....	2,008,401 lbs.	2,008,401 00

Total value .. \$498,432 51

PUEBLO SMELTING WORKS.

The following is a statement of the production of gold, silver, lead and copper turned out in 1886:

Gold.....	18,500 ozs.	\$ 370,000
Silver.....	3,500,000 ozs.	3,500,000 00
Lead.....	19,500,000 lbs.	740 000
Copper.....	100,000 lbs.	10,000 00

Total value .. \$4,620,000

The Denver Mint treated \$1,444,706.29 worth of gold in 1886, \$18,575.31 of which came from Clear Creek county.

The Elk Mountain *Pilot*, of Crested Butte, in collating the shipment of mineral, including the

coal and coke shipments, has taken great pains to get these figures as accurate as possible for the last six years—ever since there has been any shipments from the Elk mountains. Without further comment we will proceed to give the figures of the precious mineral shipment from Crested Butte for the year ending Dec. 31, 1886:

Where From.	No. Tons.	Estimate Value.
Aspen.....	310	\$15,000
Bullion King.....	200	30,000
Forest Queen.....	90	30,000
Baby Chief.....	40	6,000
Metzler concentrator.....	70	25,000
Kneelsor.....	100	20,000
Crested Butte.....	30	1,500
Domingo.....	40	5,000
Augusta.....	70	6,000
Bullion Prince.....	10	400
The Frank Smith.....	20	2,000
Miscellaneous lot.....	80	20,000
Totals.....	1,060	\$195,700

Below we give the figures of the coal and coke shipments from Crested Butte for the year ending December 31, 1886:

Monthly Shipment.	Anthracite. Tons.	Bituminous. Tons.	Coke. Tons.
January.....	1,210	3,180	2,410
February.....	2,580	2,580	2,580
March.....	3,190	2,890	2,890
April.....	3,420	2,890	2,890
May.....	5,200	2,500	2,500
June.....	240	4,530	2,510
July.....	80	4,340	1,440
August.....	570	5,610	2,040
September.....	3,940	5,620	1,800
October.....	4,650	6,070	2,890
November.....	3,540	4,630	4,010
December.....	3,690	5,680	4,180
Totals.....	37,890	54,200	31,850

In Idaho Springs district the *Gazette* gives the following: Through the courtesy of Mr. Ben Allen, manager for Matthews & Webb at this place, we find the following amount of ore was purchased by these works during the year 1886:

Silver, ozs.....	290,705 19-100
Gold, ozs.....	17,682 89-100
Lead, lbs.....	587,102 4-100
Copper, lbs.....	68,020 8-100

Or a total currency valuation of \$673,337.55.

Through the courtesy of Mr. Ralph Chase, manager for Morris, Vincent & Root, we are furnished the following figures: These works have purchased for the year ending December 31, 1886, 2565 tons of ore, which contained the following metals and value:

Silver, 136,825 ozs.....	\$136,825 00
Gold, 1206 ozs.....	30,312 00
Lead, 316,155 lbs.....	12,646 20
Copper, 15,168 lbs.....	1,616 80
Total value.....	\$190,303 00

The *Freeland* swells the grand output for 1886 by: Gold, \$245,555.21; silver, \$49,125.71; copper, \$1490.45; total, \$296,201.37. The *Plutus* comes to the front with the snug little sum for 1886 of: Gold, \$80,331; silver, \$60,163.35; copper, \$5239.53; total, \$145,733.91. There was shipped by railway from Idaho Springs, in 1886, 29,930,048 pounds of ore. Taking it upon the whole, the year 1886 has been a very prosperous one. The production has materially increased over the previous year, and the outlook for 1887 is extremely bright.

IDAHO.

While Idaho has done very well the past year, the prospects are that her hulsion product will be much increased during 1887. In the Wood River region the year has opened full of promise. According to the *Times*, the Minnie Moore, the Queen of the Hills, and other mines in and around Bellevue, never yielded so much as they do at the present time, and never had half as much ore in sight. The Climax, Creasus, Commodore, Wild Irishman, Japan, and other Croy gulch properties, are demonstrated to be mines; and the Nayaug, Snow-Fly, Montana, Red Cloud, and other claims on Deer creek, show fully as much ore. At Bullion the old favorite Mayflower is showing an extensive vein of solid galena, flanked by two or four feet of first-class jiggling ore; the Bay State shows galena, and lots of it; the Durango is being put in shape for a good yield in the spring; the King of the Hills ore body is showing more value with every foot of progress; the Idahoan is richer than ever; the Eureka, having changed hands, will be exploited in the spring, and the Pass and other claims on the divide are showing value. All this will undoubtedly combine to give Bullion a huge boom next summer.

On the east fork of Wood river the North Star is proving extensive and valuable, keeping the concentrator more than supplied with ore. The Triumph group is showing up a large value of concentrating ore, with indications of something much better in the near future, and during next season the Fork will undoubtedly make a creditable showing.

In Parker, or Elkhorn gulch, the Quaker City is showing quite a width of ore going up in the thousands, and other properties justify the prediction that the most prosperous days of the gulch are yet to come.

Boulder Creek, Galena, Vienna and Sawtooth all evince an ability and an almost instant readiness to surpass their former production, and new discoveries are confidently looked for.

Warm Springs creek and the Smoky districts also promise much. The Carrie Leonard, Galore-Stormy, King of the West, Tyrannis, Alma, Providence, Ophir, Silver Star, etc., are showing good ore; and if the yield of that section during 1887 does not exceed \$1,000,000, the *Times* will be much mistaken.

But the section of the Wood River region which promises the most, which justifies the wildest hopes, is, after all, the Gold Belt.

There is where the most of the mine fortunes in this region will be made. The veins are massive, crop out boldly, and can be traced on the surface for miles. The ore, though not altogether free, is sufficiently so to mill fairly and cheaply; and there are vast quantities of it, mountains of it, that only await the construction of mills to yield up their treasure.

In Bayhorse district O. J. Salishury, in an interview with a Salt Lake *Tribune* reporter, states that the Beardsley, Ramsborn and other mines will be extensively worked next spring. A sampling mill has been completed with a capacity of 50 tons a day for the concentration of ores. The motive power has been changed from steam to water, by which means greater pressure and increased power is attained, and can be used at all seasons of the year. At present only development work is being done, and only such ore taken out as is required to be removed. Some 15 or 20 owners of small mines about Bayhorse are at work developing their claims, and will become contributors to the concentrator and smelter.

In closing his review of the mines of the Northwest, Prof. Herbert Lang furnishes the *Oregonian* a large amount of statistical matter, which, in reference to the mines of Idaho, will prove of general interest to our readers. He says:

"We are told that the total production of Idaho's placers for the past 23 years has reached the astounding sum of \$70,000,000. Of this, \$20,000,000 have been taken from the gulches and flats of Idaho City and its vicinity in 18 years. In other words, the localities of Boise Basin, Quartzburg, Idaho City, Placerville, Pioneerville and Banner are supposed to have yielded \$1,000,000 per year for 20 years. Hardly less rich were the renowned camps of Oro Fino, Elk City, Florence, Miller's, Warren's, and the bars of the Clearwater and Salmon. But save as matters of history, these facts have no further interest for humanity, inasmuch as a great part of the sources of this wealth are practically exhausted. There still remain, however, some good but limited and isolated tracts of gravel to which the attention of miners is being gradually directed. Thus, a slight rush of miners took place lately to the head of the Payette, where new discoveries were reported. The importance of the find has not yet been made known. It is extremely probable that the placers of Kootenai county will be found to be extensive. But far there is no precise information concerning them, but a good number of men are said to be making wages on Priest's or Vermillion river, which flows from Lake Kanikso into the Pen d'Oreille. As to the Boise Basin, the best authorities say that it still contains 125,000,000 cubic yards of auriferous gravel, some of which can be made to pay if water can be brought to it."

The Boise City National Bank has prepared the following estimate of the gold, silver and lead production of Idaho during the year 1886. The 10 per cent addition to the total is the estimated value of the gold taken out by Chinese and others of which no account could be obtained:

Counties.	Gold.	Silver.	Lead.	Total.
Ada.....	\$ 5,000	.....	.....	\$ 5,000
Alturas.....	232,500	3,250,000	750,000	4,232,500
Bingham.....	20,000	.....	.....	20,000
Boise.....	665,000	125,000	.....	650,000
Cassia.....	25,000	.....	.....	25,000
Custer.....	137,000	1,000,000	125,000	1,262,000
Idaho.....	600,000	.....	.....	600,000
Lemhi.....	385,000	300,000	690,000	1,385,000
Nex Perce.....	20,000	.....	.....	20,000
Owens.....	25,000	.....	.....	25,000
Gwyhee.....	155,000	57,000	.....	212,000
Shoshone.....	800,000	300,000	100,000	1,000,000
Washington.....	5,000	.....	.....	5,000
Totals.....	\$2,664,500	\$5,032,000	\$1,655,000	\$9,351,500
Add, say 10 per cent.....	.....	.....	.....	935,500
Grand total.....	.....	.....	.....	\$10,287,000

The Cœur d'Alene country is an important part of Idaho's mining region. Samuel B. Pettingill writes as follows concerning it in the *Portland News*:

"The Cœur d'Alene country at present comprises two main districts, which, for convenience, may be designated by the names of the streams which flow through them, as the Pritchard creek district and the South Fork district. These two streams are branches of the Cœur d'Alene river, and flow in substantially a parallel course about 20 miles apart in a westerly direction. A glance at the map will show that the Bitter Root mountains, in which these streams rise, trend to the southeast, while the course of the main river is southwest. The South Fork is consequently a considerably longer and larger stream than Pritchard creek, and the mineral belt through which it flows is also more extensive. These two districts are also distinguished from each other by the mineral which each principally bears, that of Pritchard being mostly gold, that of the South Fork silver and lead. As in the case of most all mining regions, the Cœur d'Alenes were opened, not on quartz, but placer locations."

"The Cœur d'Alene country now contains several large mines of assured value, and the promise of a great many more. It has a substantial basis for business, and is open to the markets and business of the world. Its development is likely to be rapid from this time. I think I hazard nothing in saying that within a year it will have 100 productive mines. Just what it will develop into mine is not for me to say. And no man can do more than to make a good general guess at their value. The field is certainly an inviting one for enterprise and investment, and money and labor expended according to the solid principles of modern mining will tell the story. The coun-

try is especially favored in point of location, climate, water and timber. It is more than half surrounded by the Northern Pacific railroad, which runs within about 25 miles of Murray on the east, and is now connected by rail and steam navigation with the South Fork district. All the freight for Murray during the past year, except the machinery for the Golden King mill, has gone in from Thompson's Falls. But the opening of the railroad up the South Fork will bring the cars nearer to Murray and give the whole region excellent facilities for transportation."

MONTANA.

Montana is making wonderful progress in mining. After working out the famous placers years ago the Territory made little show for a long time. But on the discovery of the great mine of Butte, miners and capitalists were again attracted, and now some of the best mines in the United States are being worked. Butte is, of course, the most prominent mining center, and her mines are now turning out about 4000 tons of copper and silver ore per day. There are seven large mills in operation there, aggregating 310 stamps. The Alice has 80 stamps, Lexington 50, Bluebird 70, Moulton 40, Silver Bow 30, Dexter 15 and miscellaneous 25. The mining population of Butte is greater than that of any other camp in the world, and the prosperity of the town ceases to be a matter of wonder when the amount of money paid out monthly by the mine-owners is considered. Miners' wages are \$3.50 per day, laborers and top-men receiving \$3; lumbermen, engineers and other skilled workmen from \$4 to \$6. Mining company wages will, therefore, average about \$100 per month. The *Inter-Mountain* gives the following list of the number of employees of the leading concerns and the amount of their pay-rolls:

Company.	Men Employed.	Average Pay-roll.
Anaconda Co.....	900	\$ 90,000
Alice Co.....	345	34,500
Lexington Co.....	300	30,000
Moulton Co.....	125	12,500
Bluebird Co.....	250	25,000
Silver Bow Co.....	200	20,000
Colorado Co.....	300	30,000
Parrot Co.....	325	32,500
Montana Co.....	150	15,000
Butte Red. Works.....	50	5,000
Clark's Colusa.....	100	10,000
Mountain View.....	25	2,500
Any Silvermine.....	75	7,500
Mines near Burlington.....	150	15,000
Cora.....	25	2,500
Clear Grit.....	25	2,500
Chambers Syndicate.....	150	15,000
Golden Rule.....	30	3,000
Miscellaneous.....	500	50,000
Totals.....	4,005	\$400,500

The results of the year's work at this famous camp are decidedly encouraging, and show a marked improvement over the previous year. The *Butte Miner* says: The mines never looked more promising, and their output never more satisfactory. Their permanence and value are thoroughly established, and the value of their output for a series of years hence can be estimated with mathematical accuracy.

Notwithstanding the long shut-down of the Anaconda mine and smelter, and the brakesmen's strike at the depot, both of which largely subtracted from the freight shipments and receipts for the year, the former ran up to nearly 240,000 tons, and the latter increased from 113,060 tons for 1885 to 151,029 tons for 1886. Bullion shipments through the Pacific Express office in this city have increased from \$6,000,000 for 1885 to \$6,646,934 for the past year. The grand total output for the year is not far from \$20,000,000, exceeding the gold shipments of California for the same period of time.

Solid, substantial improvements have been made in mining facilities during the year which will largely swell the output of the district for 1887. The Burlington mill with its 70 stamps and the Butte Reduction Works are among the most prominent of these. Prospects have been developed into mines of assured value, and large bodies of ore have been opened in well-known mining properties. All the leading mines show no diminution in quantity or quality of output, and prices for contiguous properties are tending to points somewhere in the neighborhood of their real value. The outlook of the mining interest was never more flattering."

The *Butte Inter-Mountain* published a New Year's edition which for typographical appearance and make-up excelled anything we have seen of the kind. It contains a vast amount of information about Butte, and from it we condense such facts as are of general interest to non-residents. Very few of the mining properties now being profitably worked in Montana are incorporated, and still fewer are on the board; yet those that have been listed have made a proud record of dividend-payers and justly take rank among the leading properties of the country. Following is the list of Montana properties now on the board and their dividends to date:

Alice.....	\$ 775,000
Amy & Silversmith.....	235,000
Boston & Montana.....	520,000
Elkhorn.....	150,000
Granite Mountain.....	1,700,000
Hope.....	158,241
Lexington.....	665,000
Drummond.....	705,000
Hecla Con.....	1,047,500
Helena Mfg. & R. Co.....	102,000
Moulton.....	320,000
Original.....	117,000
Totals.....	\$4,753,741

These are eloquent figures, especially so in view of the fact that four-fifths of the above dividends have been earned and declared with-

in the past 18 months; but still the sum represents but a fractional part of the profit made from the development of Montana mining properties, and but a tithe of the gross output. Some of the mines of the Territory are owned by private individuals, and many others which are incorporated are not listed on the stock boards and their earnings are, therefore, not made public. Among them are the Cable and Pyrenees gold mines, the Anaconda, Parrot and many other copper mines, and the Bluebird, Colorado and Silver Bow companies, silver mines, and hundreds of others which could be mentioned. But we submit that no State or Territory of the Union contains 12 incorporated properties whose average net profits are as great as those of the above-named companies.

In the work of chloridizing the silver in the ore preparatory to its amalgamation, the quartz mills of Butte consume annually many thousand tons of salt, the chlorine gas effecting a chemical change in the silver by the liberation of the bases. The amount of salt required varies with the percentage of bases. The Lexington uses daily 10 tons, the Alice 10, the Moulton six, the Bluebird seven, the Silver Bow four, and the other mills combined about five. Thus every day there are about 42 tons of salt used in Butte, or about 15,000 tons per year, upon which the original cost is about \$2.50 and the freight \$15 from Ogden.

In the year 1886 Butte successfully passed through two great crises, viz.: the decline in copper to \$35 for Chili bars on the London market and the drop in silver to 91 cents per ounce in this country. Each while it lasted was regarded as a grave menace to the very existence of the camp, but now that prices have somewhat recovered, it appears that the depreciation has served a useful purpose, in that it indicated to what extent the copper and silver mines of Butte are capable of competing in the metal markets of the world with rival producers both at home and abroad. The Calumet and Hecla temporarily broke the market, but it could not withstand the strain of reduced prices; and when it became apparent that its famous "cut" of last spring affected its own interests more injuriously than those of the Montana producers which it aimed to drive out of the market, the Lake sharps were glad to retreat to the safe ground of honest competition, and the home market under a growing demand became firm at home prices, while foreign quotations were sensibly affected and took an appreciable rise which they have since maintained.

Upon the subject of silver and the warfare which the national bankers, Wall-street speculators, and the present administration have incessantly and dishonestly waged against it in opposition to the best interests of the country and in particular antagonism to the West and South, it is not the purpose of this article to enlarge. It is enough to call attention to the fact that the white metal has asserted itself, and despite the puny efforts of the stock gamblers and gold bugs in America and the continued refusal of England and Germany to restore its monetary value in those countries, its market value has not been destroyed, and the depreciation which it suffered from the sudden and precocious onslaught of its enemies proved of but temporary duration.

And while all these splendid enterprises are justified on cold business principles, and will reach an early consummation, the old stand-by will show no signs of weakness, and with improved methods and appliances will increase their benefactions to the world. The Alice, Moulton, Lexington, Silver Bow and Dexter mills, and the smelters of the Montana, Colorado, Parrot and Butte Reduction companies go merrily along on the even and profitable tenor of their way, producing fine bullion and copper matte and pigs to the extent of their capacity, distributing benefits to all classes of the community and giving employment to thousands of happy and frugal workmen.

From official sources, when obtainable, and from other sources equally reliable, the following record of the precious and base metal production of Butte for the year 1886 is made up by the *Inter-Mountain*:

Fine bullion, per express.....	\$5,856,500
Copper, 55,000,000 lbs. at 10c.....	5,500,000
Silver ore shipments.....	650,000
Silver in matte.....	1,240,000
Totals.....	\$13,246,500

In round figures the output in other parts of the Territory may be safely estimated at \$10,000,000 in gold, silver and lead, making a grand total of \$23,246,500.

At the town of Marysville, in Lewia and Clarke county, and about 60 miles northeast of Butte, is located the famous Drummond mine, the remarkable history of which is now so familiar to the mining world. The property is stocked for \$3,300,000, divided into 330,000 shares, having a par value of \$10, though its market value is now \$48 per share. The plant consists of three mills, containing severally 60, 50 and 10 stamps. During the past year an average of about 3000 tons of ore per month has been treated, which amount has lately been increased to 6000 by the completion of the new 60-stamp mill, which started into operation in the latter part of November. The dividend record of the Drummond for the year 1886 up to October 15th, was \$795,000, which will probably be increased to \$1,000,000 by the profits during the remainder of the year. Hereafter the dividends will be larger than before, as they will be increased by the profits of the low-grade ore which the new mill was specially designed to treat, and which previously

was not reduced. For the half year ended June 30th, the gross output of the mine with only a 50 and 10 stamp mill in operation aggregated \$700,500, from which, after deducting the current expenses during that time, there was left to be applied to the net profit account, \$439,660. The record for October is a fair sample of the year's work. In that month 3130 tons of ore were crushed by 60 stamps, the total yield being \$137,400. The regular working expenses were \$41,000. The development of the mine is now confined to the sinking of a big winze from the 400-foot level with the view of opening new ground to the depth of 600 feet, the design being to keep the mine always two years at least ahead of the mills.

The famous Granite Mountain mine, four miles from Phillipsburg, is yielding largely.

The Hope, near Phillipsburg, had its mill running last year 244 days, crushing 65723 tons of ore, producing 99 bars of bullion, the Government assay of which was 113,647.94 ounces of fine silver, equal to 17.30 ounces per ton, producing in hand \$112,261.38. The expenses of the mill were \$26,216.74, equaling \$4 per ton on the quantity of ore reduced.

The Moulton company has been a steady shipper of fine bullion, one-half of which during the year has been from custom ore and one-half from the mine. The value of the bullion yield for the year is \$625,000.

The total copper product of the Parrot company for the past year is estimated at 14,000,000 pounds, which, though it does not represent the capacity of the works, is upward of 1,000,000 pounds more than the output of 1886. At ten cents per pound, the average price of copper for this year, the value of the output is \$1,400,000.

The Anaconda mine belongs mainly to J. B. Haggin, of San Francisco. The town of Anaconda, with its 4000 inhabitants, which is the child of the Anaconda company, affords proof enough of the magnitude of the enterprise and of the determination of Mr. Haggin to manage it on a broad and liberal scale. The Anaconda mine, with its 1000-foot shaft and miles of drifts and crosscuts, opens up an ore body whose average width of 50 feet for a length of 3000 feet we believe to be the most phenomenal copper property on the globe. That a concentrating and smelting plant, with all the appliances needed to treat the output of such a mighty producer, should have been erected at Anaconda at a cost of \$2,000,000, may excite admiration by the stupendous proportions of the work; but after all, it is but a logical business sequence of the mine development. The plant is now treating 1000 tons of ore per day and producing 100 tons of copper matte, and there is no reason why this supply should not continue for half a century. On the payrolls of the company are 1200 men, and directly and indirectly it contributes to the support of 5000 people in the counties of Silver Bow and Deer Lodge. These are eloquent figures, and they tell more of enterprise, nerve and brains than pages of detail could convey. An experience of two years has shown the management the secret of successful copper manufacture to lie in organization, in economy, in constant watchfulness, in the utilization of natural forces, as far as possible, and in the practical application of scientific principles. This lesson has been well learned, and now, after a period of several months, during which the smelter did not run, the company is equipped with every facility to enter the field of American and foreign competition. As a mining proposition, the Anaconda, with its allied claims, is the greatest on the earth to-day, and it is backed with better mines and more money than any other.

To Mr. Spruille Braden, manager of the Government assay office at Helena, the *Inter-Mountain* is indebted for the following statement of the business transacted by that institution for the year ending December, 1886:

VALUE GOLD AND SILVER.		
Month.	Value Gold.	Value Silver.
January.....	\$ 18,727.73	\$ 206.07
February.....	25,298.97	327.33
March.....	14,876.62	146.80
April.....	45,945.92	1,160.94
May.....	111,551.61	36,650.63
June.....	170,428.56	40,405.65
July.....	161,672.23	36,652.11
August.....	182,612.29	24,642.53
September.....	155,637.06	20,490.24
October.....	173,656.55	3,766.39
November.....	165,990.17	3,054.01
December (approx.)	93,141.61	1,744.14
Totals.....	\$1,356,547.61	\$169,250.14
Total value gold and silver, \$1,525,797.75.		

NEW MEXICO.

New Mexico is slowly coming forward into more notice as a mining region. The great drawback is lack of sufficient capital to conduct operations properly. Within the Territory are many good mines that would pay capitalists handsomely if they would only take hold of them. The miners there, however, are working away hopefully, knowing that in process of time the money must come where there are good mines.

In the Black Range region mining operations are comparatively quiet, but at the same time very encouraging. Considerable work is being done on the quiet; many mine-owners are getting their properties in shape so as to be ready for the mill when it starts up. The lixiviation works once in operation there will be a vast change in the mining industry of the northern portion of the Black Range which has an abundance of precious metal within true fissure veins, denoting the fact that there is untold wealth for those who seek it.

In Sierra county the output of the Hermosa

camp for the year past is something over \$50,000. At Hillsboro the 10-stamp mill is running full head on the ores of the Snake and Bohtail gold ores, owned by Chapman & Thompson, and has no time to give to customers.

At Georgetown, Grant county, are the Naiad Queen, Commercial, and many other mines at work. There is also a large iron mine there known as the Ironhead.

The Sierra Grande mines, at Lake Valley, are leased to practical miners on the following terms: Twenty-five per cent on less than 1000 ozs. per month; 30 per cent on less than 2000 and over 1000; 35 per cent on less than 3000 and over 2000; 40 per cent on less than 4000 and over 3000; 45 per cent on less than 5000 and over 4000; 50 per cent on all over 5000 ounces per month. The Sierra Grande property is in the list of dividend-paying mines.

The new county of Sierra, says a correspondent of the *Socorro Bulletin*, is a little southwest of the territorial center. It is compact, with a breadth of about 50 miles from east to west, and a length of about 60 miles from north to south. It lays claim to being the richest in mineral wealth of any county in New Mexico, and embraces within its boundaries Lake Valley, Hillsborough, Kingston, Hermosa, Chloride and other camps where rich mineral has been found.

Lake Valley, the terminus of the branch of the Atchison, Topeka & Santa Fe Railroad extending in this direction, has for years been the seat of extensive mining operations, and laid claim to being the richest mining camp in the West. Millions of dollars have been taken out of her mines, and she will yet yield untold millions when the problem has been solved of treating profitably her lower grade ores; especially so since the mines can now work without danger from depredations of Apaches who for so many long years were a source of constant menace to the miner and settler. True, the rich mineral deposits known to exist at Kingston, and on the South, Middle, and North Perchas, and in the same belt away to the north at Hermosa and beyond, were enough to lure many adventurous spirits in quest of fortunes to those promising El Dorado; but danger from the Indians prevented any development of note, except in the immediate vicinity of Kingston, and there only to a limited extent. But since the Indian question has been settled, within a year past, Kingston has sprung rapidly to the front, until now Lake Valley has to yield the palm to her.

Among the Kingston mines are the Illinois, Brush-heap, Lochiel, Iron King, Superior, Bullion, Lady Franklin, Black Colt, Comstock, Kangaroo, Deadwood, Butte, Miner's Dream, Miner's Delight, etc. The sampling works at Kingston employ 20 wagons constantly delivering ore at Lake Valley.

The mineral and bullion product of Socorro county we will give in a future number.

The newest excitement in New Mexico is the Gold Camp, a recent discovery, which has been fully described already in the *PRESS*. Lack of space prevents our giving as extended a notice of this Territory as was our intention.

OREGON.

The main interest in Oregon mines last year centered in the Pine Creek mines, though it cannot be said the camp came up to expectations. Capital is needed there as elsewhere, but it is now claimed Eastern capitalists are going to take hold of the mines. New wagon-roads have been constructed to the mines, through State aid, and outside capital has taken hold with some degree of vigor. The mines have been found to improve as depth was reached, although the character of the ore changed from free milling to sulphurets, but grew richer. Many difficulties have been overcome and the outlook for Pine Creek is now more promising than at any time since the discovery of the mines.

In Baker county there are eight organized mining districts, which are more or less productive, and several more will probably be organized this coming spring. Prospectors have been successful in finding new ledges as a result of their summer's work, and capital will be induced to develop them. There are many placer diggings as well as quartz mines, and the county affords a good field for miners and capitalists.

The gold-bearing districts of Oregon are, in most part, the continuation north of the great talcosa slate zones of California, with all their accompanying dykes of granites, porphyries, greenstones or diorites, and extending north and northeast until they disappear under the great basaltic overflow of the Columbia river basin. They spread broadly out east and west (with alternations of basaltic lava) from the Coast Range, in Josephine and Curry counties, to the Snake river along the eastern border of Baker and Union counties.

Wherever these metamorphic slates are found in the southern counties, gold has been found in the streams, and more or less gold bearing quartz, either as "float" or in veins, has also been discovered. Large areas, even of these southern and eastern counties, have been covered by the lava overflows, and it is useless to prospect in such localities; but wherever the slates, granites, porphyries and greenstones appear there is a reasonable hope or chance to find gold and silver mines.

Portland now has reduction works, and judging from what the *News* thinks, there will be more of them in time. That paper says: From Southern Oregon clear across the mountains to Pine creek and the mineral fields of Baker county; from the old and tried treasure-

vanits of Owyhee, Wood river and Salmon river, to Colville and Okanogan; from the forest-clad hills of Cœur d'Alene to the silver ledges of Butte and other prosperous districts in Montana, the mines have been yielding up their stores of hidden wealth, and new regions are constantly opened up before the intrepid prospector. Within the past year millions of dollars have been added to the wealth of the world from the mines of the Northwest.

The mineral fields naturally tributary to Portland (and that includes the entire Northwest) are, comparatively speaking, but a stone's throw from railroad transportation, and are easily accessible for all sorts of supplies. If any reliance is to be placed on indications, geological formations and the opinions of trustworthy experts, there is sufficient in the mountain ranges of Oregon and the Northwest generally to eclipse the output of Nevada in the palmiest days of the Comstock. Reports from all the leading mining districts of the Northwest clearly indicate the activity that now exists in this mining industry, and show the opportunities now within reach to make Portland the greatest mining center in the country. They show what these mines are now doing toward the development of the country.

In Douglas county are a number of mines. They have of nickel ores three varieties; non-mete, garnierite and nickelerous-phyrotite. Of iron ores, five varieties; manganiferous, magnetic, limonite, hematite and chromite. Of quicksilver, two varieties; cinnabar and metacinnabarite. Of copper, four varieties; native copper, chalcopyrite, copper glance and blue and green carbonates, the latter, however, only as incrustations. Gold occurs native in quartz. Silver is found in placer washing as electrum, a native alloy with gold, and is also found associated with gold in some of the quartz. Very little prospecting has been done in that portion bounded by the Cascades on the east, the Coast Range on the west; the Calapooia mountains on the north and the Siskiyou on the south, embracing the counties of Douglas, Jackson and Josephine.

UTAH.

In the realm of Utah's great industry, mining, the work of the year 1886 was in some respects more satisfactory than in any former year. While the product of the great Horn Silver has been shut off, the full sum has been more than fully made up by increased product from numerous old and some new mines. With the vitalizing influence which comes of gold and silver mining, because of its product, labor has been promptly and abundantly rewarded, and a market has been made for all the products of field and garden.

The mines in the vicinity of Park City have furnished from one fifth to one-fourth, possibly more, of the ore and bullion production of the entire country. The *Record* says: Park City is the mining camp of the Territory, and Uintah, Blue Ledge and Snake Creek are the leading mining districts—all others follow. With pride we always refer to the Ontario as a model mine. It is to Park City and the Territory what the old Comstock was to Virginia City and Nevada. With few exceptions it has paid more profits, and has more ore in sight; it is operated economically and honestly and is a marvel of the mining industry. The Ontario has produced over \$17,000,000 and has paid nearly \$3,000,000 in dividends. The Daly is in the front ranks and will prove to be a second Ontario. The Crescent, Sampson and Apex are making fair records as ore-producers, and we expect before another year roll around to announce ore shipments from the Anchor, Morgan, Jupiter, and, in fact, from a score of a rich but comparatively undeveloped properties which will be opened up within another year.

We condense from the *Record's* review the following concerning Park City mines: Operations on the Ontario Silver Mining Co.'s ground the past year have been on the usual large scale, and the results show most satisfactorily. The work of uncovering the ledges and taking ore from the immense ore-bearing bodies goes on with regularity. About 300 men are employed in and about the three principal workings of the mine. Through the kindness of Superintendent R. C. Chambers we are enabled to give our readers a few figures: The bullion sales for the year to date have amounted to \$1,011,178.49, and the sales of ore were \$642,515.89—a total production of \$1,653,694.38. The Ontario has lately spent \$60,000 in permanent improvements; \$900,000 in dividends were declared in '86, and three years' dividends are said to be in sight.

During the 12 months just ended the Daly's bullion sales amounted to \$522,270.06, and the ore sales for the same period were \$215,855.53; total production, \$738,125.59.

From the Crescent during the year ending last October, 6320 cars of shipping ore and 29,265 cars of concentrating ore, averaging three tons to the car, were sent down the tramway. The ore sales for the same period amounted to over \$187,000, and early last summer dividend No. 6, of \$30,000, or five cents a share, was paid.

The Ontario and Daly mills are running to their fullest capacities and good results are forthcoming. The Crescent concentrator will be closed until next spring. The Mackintosh handles all or nearly all the shipping ore produced in the Park, last year's being nearly 15,000 tons. The sampler is doing good service, and the Wall rolls do better work than the old coffee mill. The product of the mines (and the mills) of Park City for the 12 months

of 1886 has reached nearly \$3,000,000. Where is the district that has done better?

The following is the statement of ore received and shipped by the Mackintosh sampler for the year ended Dec. 3, 1886:

	Pounds.
Ontario.....	21,605,700
Daly.....	6,603,680
Sampson.....	1,506,770
Hayt Bros.....	60,650
Apex.....	53,850
Jupiter.....	38,920
Woodside.....	24,850
Creole.....	15,230
Total pounds.....	29,912,690

The value of the shipments will probably reach nearly \$1,000,000.

The Salt Lake *Tribune* issued a double-sheet number recently, reviewing the year's business of the Territory. From the facts there stated we collate the following information concerning the mines: The past year the silver sandstone district, of Silver Reef, turned out 393,621 ounces of silver, of which the Stormont Company sent out bullion to the value of \$140,880.87, the Christy Company about \$213,000 worth, while the leaching works of the old Leeds mill added in the shape of sulphides of silver about \$40,000. It was only last July that the leaching process at the Leeds mill became a success in saving silver, and that was after a long series of experiments and an entire remodeling of the mill. The mines belonging to the Stormont and Christy Companies look well and have large ore reserves from which to draw. The other mines about Silver Reef are lying dormant, among which is the old Barbee & Walker, reputed to be an excellent property, now in the hands of Wells, Fargo & Co.

Last year 750 tons of salt were mined in San Pete county and 700 tons were shipped from Salina. About 23,000 tons, worth \$100,000, was collected from the Great Salt Lake, most of it being shipped to the silver mills of Utah, Idaho, Colorado and Montana.

The D. & R. G. W. report 237,680 pounds of ore shipped from Wasatch station to the smelters. This means that the company carried that amount of Little Cottonwood ore, but it does not include the entire output of the mines about Alta. In the Emma good progress was made in driving crosscuts, and there is a promise of large ore shipments next season.

The old reliable camp of Bingham, which the past has produced over \$22,000,000, has look of prosperity and activity now which pleases. The railway weights show that over 37,000,000 pounds of ore was sent from Bingham station during the year just closed. As great a haul as this is, it is not all of the output of that camp, there having been nearly as much more sent by teams from the Brooklyn, Yosemite and other properties in that neighborhood, bringing the total output for the year up to over 30,000 tons.

From Stockton district never before has the railroad carried so much ore to market. The smelter was started up and made a short experimental run. The Honerine Company shipped about 1800 tons of ore and concentrates, and they promise to more than double this in 1887. The Silver King, owned by a St. Louis company, shipped about 1800 tons of ore, worth \$25 per ton. The Calumet and Hecla, belonging to the same company, shipped about 1000 tons of ore which marketed about \$50, on an average, and they did large development work on the property. The Catherine, belonging to a Chicago company, sent out about 1000 tons of ore, which averaged about \$50 per ton, and they have since been doing large development work, which will be carried on till spring.

The Argent was worked on a lease, and shipped about 500 tons of \$50 ore. It looks well and promises to be a large shipper this year.

The chief operations on the Ophir side were with the Consolidated Mining Company, owning the Buckhorn, Eighth of January, Monument, Mountain Glen, Antelope, Gray Rock, Battle Axe, Tomahawk and General Sherman. The output for the year was about 2500 tons of carbonate and galena ore, running from 15 to 30 per cent lead and 9 to 20 ounces silver, with a little gold, also. Take the entire district, including Stockton, Dry Canyon and Ophir, and there are such signs of new life as must make the district come to the front as a large ore-producer, and that not far in the future. The Honerine company, with its mill and various mines, paid seven dividends during the year, aggregating \$87,000, and there is a promise of doing much better in 1887.

The past year has been one of progress with the Tintic District. While the Eureka Hill and Bullion-Beck properties have been somewhat prescribed in their operations by being tied up in the courts, their output was large, the former having shipped over 9000 tons of ore, while the Bullion-Beck sent out about 5500 tons, and is now shipping 50 tons of high-grade ore per day. New machinery has also been added. On the Bullion-Beck there have been grand improvements since the property was taken in charge by Capt. H. H. Day, a year ago. The Eureka Hill Mining company added much new machinery during the past year. The company is doing well in every respect, and being regular in its ore shipments, is destined to continue its prosperity indefinitely. The equipment of the mine now is all that will be required for years.

The Mammoth Co. comes next in the ore product of the year, having sent out 2545 tons of ore, beside producing 86,328 pounds of matte at their Tintic furnaces. The Mammoth is to be pushed in its development and will continue to employ a large force.

Considerable work was done on the Copperopolis during the year. The iron mines sent out over 12,000 tons of ore for use in the smelters in fluxing ores. Those mines are regular in their output to just the extent of the demand for iron ore at our local smelters, and for what may be wanted elsewhere. There was no outside demand the past year as in former years.

The Tintic Mining & Milling Co. did well during the year. The mill at Homansville turned out bars of bullion to the amount of 17,000 ounces of silver, and 160 ounces of gold, from the 750 tons ore milled, while they shipped 643,100 pounds of ore assaying about 55 ounces of silver and \$20 in gold.

From a table in the *Tribune* we take the following as showing the ore shipments from Tintic district, in pounds: Eureka Hill, 18,056,020 pounds; Bullion and Back, 10,835,010; Mammoth, 5,190,570; Northern Spy, 671,100; Gemini group, 1,313,430; Iron ore, 24,072,520; Centennial and Eureka, 77,300; Park, 97,720; Swansea, \$5,370; Showers Cons., \$7,460; Hungarian, \$5,700; Jos Daly, 22,450; Silver Coin, 54,480; Martha Washington, 108,550; Tesora, 50,250; Scotia, 20,000; Silver Bow, 10,790; Brooklyn, 10,500; Mono, 20,250; Showers Ex., 142,630; Susan, 28,560; North Star, 6100; Old Chief, 24,000; Diamond King, 10,300; Mitchells, 2250; Lancaster, 4450; King, 7900; Yankee Blade, 10,200; total, 61,084,410.

Besides these shipments of ore, the Northern Spy milled 750 tons at their Homansville mill, and the Mammoth made an experimental run of their smelter and turned out 86,328 pounds of matte. Bringing down to smaller figures, we have a product of the iron mines of 12,036 tons, and 18,505 tons and 1890 pounds of silver and copper ore shipments, to which should be added 100 tons of Mammoth ore smelted and 750 tons of Northern Spy worked, bringing the total product of silver and copper ore up to 19,356 tons, making a grand total of 31,392 tons. The Eureka Hill Mining Company marketed 9028 tons of ore, of which 3072 tons were reduced in the smelters of Utah, and the balance, 5956 tons, was shipped to Colorado.

Outside of the Horn Silver there was shipped from Frisco, ore, concentrates, and matte to the amount of 1,662,534 pounds. The carbonate dump and the tailings pile are being concentrated by some leasers. At first an experiment was made in leaching, without success, and a change was made to concentrating. Operations did not begin until late in the season, since which they shipped 211,814 pounds concentrates. J. S. Jenkins worked over different dumps from which he sent out 499,150 pounds of ore.

Utah's metal product for 1886 is given in tabular form on page 67 of this number of the *PRESS*.

WASHINGTON.

Washington Territory does not produce much gold and silver. Extensive galena ledges have been found and are to be opened. The main mineral resource of the Territory is in its coal mines. Thousands of tons of coal are mined there annually and shipped away. Much of it finds its way to this city. Statistics of the coal production of Washington are not yet available, and its precious metal product was given in another column.

The Debris Question in the Legislature.

On Wednesday last the Assembly made a special order of the bill introduced by Mr. Ohlseyer, of Sutter county, and discussed it. In the *PRESS* of Jan. 15th this bill was summarized, and we here append it in full. It is ostensibly to "protect navigable streams," and is as follows:

SECTION 1. Every person who, by the use of water under hydraulic pressure, shall place, deposit, dump, discharge or wash, or in any manner assist in placing, depositing, dumping, discharging or washing, any tailings, boulders, cobbles, stones, gravel, sand, clay, earth, debris or refuse matter into any navigable stream, or into any fork, branch, affluent or tributary of any navigable stream, or into any place or situation on shore where the same shall be liable to be washed into navigable streams, or into any fork, branch, affluent or tributary thereof, either by storm or floods or otherwise; and every person who shall suffer or allow any other person to use any water supply, in whole or in part owned or controlled by him for any of the purposes aforesaid, is guilty of felony, and is punishable by a fine of not less than \$100 nor more than \$1000, or by imprisonment in the State Prison for not more than one year, or by both such fine and imprisonment.

SEC. 2. The jurisdiction of a violation of any provision of this Act is in any county, first, in which any act is done toward the commission of the offense, or second, into, out of, through, or along which the navigable streams flow which—or any fork, branch, affluent or tributary of which—is affected by the commission of such offense.

It is not believed that the time has come when such a bill can come anywhere near receiving the sanction of the Legislature when fairly considered and the interest of both sides duly weighed. The spirit of the bill is shown by the discussion and the opinions of some of the representative men of the various counties of the State.

When the measure was called up Brusie (R.), of Amador, moved that the enacting clause be stricken out.

Variel (R.), of Plumas, arose and made a spirited attack on the bill. He said: "This bill

applies to many different kinds of mines. Why, in drift mines tunnels are run in under a mass of rock and the pay gravel extracted, which is washed from a reservoir by hydraulic pressure. Now, there isn't a drift mine in the State that will not come under this law. If one cubic inch of gravel is washed by this means into any small stream, the miners will be declared felons. The Anti-Debris Association of Yuba has come here through its agent and is putting in this bill. It operates against the miners on the Trinity and Klamath rivers as well as the Feather and Sacramento. It is aimed at every man who dumps even a wheel-barrow load of mining gravel into a river. It is iniquitous. It stops a vast interest uselessly. I am not here as the paid servant of a corporation or association, but simply as the representative of my constituents. If I should fail to raise my voice in their defense, I should be recreant in my duty. There was a time when the miners sat in honor on this floor. To-day there are men within the sound of my voice who hold the memories of 35 years of California history. I appeal to them to bear me in the name of those who made our Constitution and framed our laws, and see to it that the miner in his old age is not turned out of his only means of livelihood and die of starvation."

Campbell (R.), of Del Norte and Siskiyou, said that such a bill as this would nearly ruin three counties which depended on hydraulic and placer mines, and mining had been nearly stopped there already, and this bill was like kicking a fallen man. There was no need of any such law as this. It was better far to have a commission of competent engineers appointed to investigate this important question and provide a remedy.

Hart (D.), of Colusa, said he was in favor of the bill, if it could be modified. His county contributed \$2000 a year to prevent hydraulic mining. He knew that the laws prohibited hydraulic mining, but, nevertheless, such a bill was needed.

Shanahan (D.), of Shasta, said that this bill was meant to punish the guilty and yet it really punished thousands of innocent people. The bill would confine to the State Prison two-thirds of the county of Trinity. The mining ditches in the northern counties were used to irrigate thousands of small farms as well as providing water for the mines. This bill subverted no good purpose in God's world, and should not prevail.

Remson (D.), of Monterey, said: "To hear some of the opposers of this bill talk, one would think we were living in the days of '49. It is true that the miners have done much for the State, but who has built up the interest of our State for 20 years? I am not in favor of the full bill, but its principle is right. The hydraulic miners have a right to work their mines. We do not pretend to stop them, but we do insist that they shall not injure farmers in following their pursuits. I am not in favor of every measure in this bill, but I believe that it should have full discussion. It is more beneficial to the interests of California than the small farmers should not have their homes swept away than that the miners should be protected in their obnoxious customs. Enough sympathy has been wasted on the miners. It is time to give the farmers a chance."

Brusie said: "I shall not embellish my remarks with eloquence; but I stand up to speak in the defense of justice, and this discussion will draw the lines between the conservative

man and the 'cincher.' I am astonished at the greed and malice some of the members in this house exhibit. The severity of this bill adds insult to injury. Have we miners maintained that we wished to exercise our rights of property to the injury of others? We have submitted to the decrees of the courts, and yet they now come to humiliate us. I can quote from Mr. Catlin's speech on this question—one of the ablest ever given in defense of the miners. He shows that only 1000 acres were damaged in the Sacramento valley—one acre out of every 125 was all the ratio that could be shown and some little rancher who raised hop-poles and tomatoes wanted to stop one of the chief industries of this State. Some of you want to withdraw this bill and modify it. Don't do it. You can't palliate an attempt to murder. Stand by your hill and take the consequences. In Amador county, where I live, there are many farmers, but they let the miners in the mountains live."

Taylor (R.), of Sacramento, thought that it was natural that he should speak in favor of a bill which protected his own city. He felt that the bill was too severe, but at least its spirit should be carried out.

Young (D.), of San Joaquin, hoped that this bill would come before the House. He represented a county that wanted it very badly, and the city of Stockton was anxious for it. The river there was filling up year after year and navigation was paralyzed.

Brierly (R.), of Los Angeles, said that while he thought hydraulic mining ought to be stopped, yet he considered the bill far too severe. The present laws were sufficient. One might as well include the city of Sacramento in the scope of this, because it had built so high a levee and changed the channel of the American so that it overwhelmed the farmers on the other side of the river.

Granger (D.), of Butte, said that he felt it due to his constituents to classify this bill as a dangerous innovation upon the customs and usages of this country. A strict analysis of all the features of this bill would show the members its dangerous qualities. Such legislation should not be brought into the House. It was an unjust measure. In his county \$2,000,000 in property had been shut off. The Anti-Debris Association was attempting to make that a crime which was not a crime.

Complimentary Samples.

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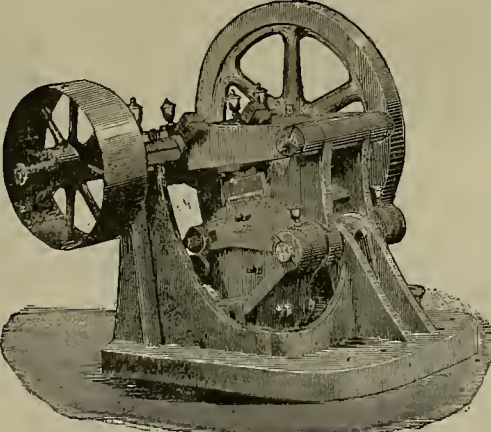
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DELINQUENT SALE NOTICE.

Golconda Mining Company—Location of principal place of business, San Francisco, California.
Location of works, Calico Mining District, San Bernardino County, California.

NOTICE.—There is delinquent upon the following described stock, on account of Assessment (No. 2) levied on the 22d day of December, 1886, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificates.	Shares.	Amount.
Buffington, J. M., Trustee	270	1000	\$30 00
Buffington, J. M., Trustee	277	5 00	150 00
Buffington, J. M., Trustee	278	5 00	150 00
Buffington, J. M., Trustee	279	1000	30 00
Buffington, J. M., Trustee	280	1000	30 00
Buffington, J. M., Trustee	286	1000	30 00
Buffington, J. M., Trustee	287	1000	30 00
Buffington, J. M., Trustee	288	1000	30 00
Buffington, J. M., Trustee	290	1000	30 00
Buffington, J. M., Trustee	291	1000	30 00
Buffington, J. M., Trustee	292	1000	30 00
Cantrill, T. G., Trustee	293	17,000	510 00
Cantrill, T. G., Trustee	294	1000	50 00
Cantrill, T. G., Trustee	295	1000	30 00
Cantrill, T. G., Trustee	296	1000	30 00
Caldwell, Wm., Trustee	42	1000	30 00
Caldwell, Wm., Trustee	43	1000	30 00
Caldwell, Wm., Trustee	44	1000	30 00
Caldwell, Wm., Trustee	46	500	15 00
Caldwell, Wm., Trustee	176	200	6 00
Caldwell, Wm., Trustee	177	100	3 00
Caldwell, Wm., Trustee	178	100	3 00
Caldwell, Wm., Trustee	179	50	1 50
Caldwell, Wm., Trustee	180	25	75
Caldwell, Wm., Trustee	181	25	75
Coleman, C., Trustee	192	20	60
Daly, J. Jr., Trustee	195	480	14 40
Daly, Mary	182	50	1 50
Daly, Mary	184	50	1 50
Daly, Mary	186	400	12 00
Finlay, John	205	20	60
Finlay, John	206	100	3 00
Green, A. V.	32	20	60
Hawkins, Mrs. A.	160	100	3 00
Hawkins, Mrs. A.	170	160	3 00
Hut t, H. S.	171	100	3 00
Hunt, H. S.	190	25	75
Hunt, H. S.	192	25	75
Hunt, H. S.	200	25	75
Hunt, H. S.	201	25	75
Lloyd, R. H.	31	20	60
Lloyd, R. H., Trustee	36	6000	200 40
Lynch, Annie	184	20	60
Lynch, Annie	185	80	2 40
Marshall, R. C., Trustee	103	600	180 00
McKinnon, J. J., Trustee	197	5000	150 00
Morehouse, P. F.	173	500	15 00
Morehouse, P. F.	174	400	12 00
Morehouse, P. F.	175	100	3 00
Morehouse, P. F.	302	1500	45 00
Rikert, A. M.	7	500	15 00
Rikert, A. M.	21	20	60
Rikert, A. M.	25	1000	30 00
Rikert, A. M.	27	100	3 00
Rikert, A. M.	91	100	3 00
Rikert, A. M.	92	100	3 00
Rikert, A. M.	102	50	1 50
Rikert, A. M.	103	50	1 50
Rikert, A. M.	110	20	60
Rikert, A. M.	111	20	60
Rikert, A. M.	112	20	60
Rikert, A. M.	113	20	60
Rikert, A. M.	118	20	60
Rikert, A. M.	120	20	60
Rikert, A. M.	121	20	60
Rikert, A. M.	125	20	60
Rikert, A. M.	126	20	60
Rikert, A. M.	136	20	60
Rikert, A. M.	137	10	30
Rikert, A. M.	147	10	30
Rikert, A. M.	150	10	30
Rikert, A. M.	153	10	30
Rikert, A. M.	164	10	30
Rikert, A. M.	155	10	30
Rikert, A. M.	157	10	30
Rikert, A. M.	160	10	30
Rikert, A. M.	208	100	3 00
Rikert, A. M.	210	50	1 50
Rikert, A. M.	242	100	3 00
Rikert, A. M.	243	50	1 50
Rikert, A. M.	244	50	1 50
Rikert, A. M.	247	100	3 00
Rikert, A. M.	249	20	60
Rikert, A. M.	250	20	60
Rikert, A. M.	251	20	60
Rikert, I. F.	47	5000	150 00
Rikert, I. F.	48	5000	150 00
Rikert, I. F.	49	1000	30 00
Rikert, I. F.	50	1000	30 00
Rikert, I. F.	51	500	15 00
Rikert, I. F.	52	500	15 00
Rikert, I. F.	53	250	7 50
Rikert, I. F.	54	250	7 50
Rikert, Annie Kline	213	100	3 00
Rikert, Annie Kline	214	100	3 00
Rikert, Annie Kline	215	100	3 00
Rikert, Annie Kline	216	50	1 50
Rikert, Annie Kline	217	50	1 50
Rikert, Annie Kline	218	20	60
Rikert, Annie Kline	219	20	60
Rikert, Annie Kline	220	20	60
Rikert, Annie Kline	221	20	60
Rikert, Annie Kline	222	20	60
Swanton, Mary	302	400	12 00
Swanton, Mary	303	100	3 00
Townsend, Annie Maud	229	800	24 00
Worn, Geo A.	224	3000	90 00
Worn, Geo A.	225	500	15 00
Worn, Geo A.	226	500	15 00
Worn, Geo A.	227	500	15 00
Worn, Geo A.	228	500	15 00

And in accordance with law, and an order of the Board of Directors, made on the 22d day of December, 1886, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the company, room 4, 309 California street, San Francisco, California, on Wednesday, the 16th day of February, 1887, at the hour of 2 o'clock p. m., of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of the sale.

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List of U. S. Patents for Pacific Coast Inventors.

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From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 262 Market St., S. F.

FOR WEEK ENDING JANUARY 13, 1887.

- 356,102.—HAME TUG—S. B. Davis, Eureka, Cal.
 356,312.—WHEEL FOR SLIVERING JUTE—H. P. Garland, San Quentin, Cal.
 356,282.—ELECTRIC ARC LAMP—A. Harding, Oakland, Cal.
 356,317.—SLIDING GATE—James & Lazenby, Compton, Cal.
 356,284.—REVOLVING PLOW—A. F. La Shells, Biggs, Cal.
 356,285.—SHIELD FOR BOILER FURNACES—Wm. Madden, S. F.
 356,287.—ORE FURNACE—T. McGinnis, Anaconda, M. T.
 356,295.—WINDMILL REGULATOR—H. R. Stephens, Soledad, Cal.
 356,180.—BUTTER WRAPPER—S. Tilton, San Geronimo, Cal.

Mark.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

REVERSIBLE WINDOW SASH.—Philip Adelson and Louis Proll, S. F. No. 355,905. Dated Jan. 11, 1887. The invention relates to improvements in that class of window sashes which are journaled so as to turn or pivot upon their horizontal journals for the purpose of reversing the sash, so that access may be had to the glass on either side. The window sashes are pivoted or journaled midway of their length to shoes, so that they may turn about their journals to any desired position, and they have also a spring or other looking bolt at the top by which they are connected with the shoes when turned in a vertical position. In combination with this device is a sliding adjustable strip for the lower sash and a stationary strip for the upper sash to keep out the dust and wind.

TELEPHONE TRANSMITTER.—J. C. H. Stut, S. F. No. 355,952. Dated Jan. 11, 1887. This invention relates to certain improvements in telephones, and its object is to construct a transmitting-telephone, which will produce a larger volume of sound heretofore available by giving a larger variation to the intensity of current in both the primary and secondary circuits, so that conversation may be carried on over a greater distance of line-wire and better overcoming the extraneous inductions, leaks and resistances. It consists of a diaphragm of large diameter, with means for regulating the radial tension and making a softer and more melodious tone, unstable contact points, and multiple variable-resistance contact, adjustable poles in connection with the induction coils, and a means for adjusting the contacts for different distances over which communication may take place, and means for providing a damper for the diaphragm by the aid of the magnetic current to increase and decrease the vibrations of the diaphragm. Certain details of construction are also covered by the patent.

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Jan. 27, 1888.	
ANTIMONY—French Str.	25 @
BORAX—San Bernardino	25 @
Armstrong	25 @
IRON—Hingham ton	25 @
Eglington ton	25 @
American Soft, No. 1, ton	24 00 @
Oregon Pig ton	21 00 @
Oregon Cap, No. 1, 500 bag	22 00 @
Oregon Cap, No. 2, 500 bag	21 50 @
Shots, No. 1	23 50 @
COPPER—	
Bolt	25 @
Sheeting	13 @
Ingot	12 @
LEAD—Pig	4 75 @
Bar	5 25 @
Shot	5 25 @
Shot, discount 10% on 500 bag	1 50 @
Buck, 3 bag	1 85 @
Chilled, do.	2 05 @
QUICKSILVER—By the flask	38 50 @
Flasks, new	1 06 @
Flasks, old	85 @
STEEL—English, lb.	14 @
Black Diamond, ordinary sizes	10 @
Plow	4 @
Machinery	6 @
Sanderson Bros	10 @

A PRESENT TO A PRESIDENT.—The students of the Pacific Business College, in this city, surprised Prof. T. A. Robinson two days before New Year's, by giving him a handsome black cane, with an elaborate gold handle, suitably inscribed. Felicitous presentation speeches were made by Messrs. A. D. Ewing and W. A. McNamara; and Pres. Robinson, though taken off his guard by this manifestation of his pupils' kind regard, responded in a strain playful yet feeling.

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ASSESSMENTS.

COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Con M Co.	Nevada.	21.	50.	Jan 12.	Feb 17.	Mar 10.	L Osborn.	379 Montgomery St
Andes S M Co.	Nevada.	31.	25.	Jan 24.	Mar 3.	Mar 23.	R F Burris.	303 Montgomery St
Bodie Con M Co.	California.	31.	50.	Jan 24.	Feb 28.	Mar 28.	G W Sessions.	309 Montgomery St
Bullion M Co.	Nevada.	32.	40.	Jan 22.	Mar 1.	Mar 17.	R R Grayson.	327 Pine St
Champion M Co.	California.	23.	10.	Nov 22.	Jan 7.	Jan 28.	T Wetzel.	552 Montgomery St
Columbus Con M Co.	Nevada.	5.	50.	Dec 22.	Jan 27.	Feb 18.	J M Buffington.	309 California St
Dictator Con M Co.	Nevada.	1.	01.	Dec 15.	Jan 23.	Feb 12.	J F Roller.	Hawthorne Nev
Excelsior W & M Co.	California.	10.	150.	Jan 3.	Feb 3.	Feb 21.	W J Stewart.	215 Sansome St
Four Hills Mine.	California.	1.	25.	Jan 22.	Feb 28.	Mar 21.	F S Moody.	328 Montgomery St
Geleconda M Co.	California.	2.	03.	Dec 22.	Jan 27.	Feb 16.	J M Buffington.	309 California St
Gold Point Con G & S M Co.	California.	13.	01.	Jan 8.	Feb 9.	Feb 25.	A B Brady.	Grass Valley
Indian Springs Drift M Co.	California.	7.	30.	Dec 30.	Jan 31.	Feb 15.	L H Sharp.	215 Sansome St
Kincaid Flat M Co.	California.	4.	200.	Jan 5.	Feb 14.	Mar 7.	W H Keith.	432 California St
Live Oak D G M Co.	California.	4.	10.	Dec 7.	Jan 15.	Feb 5.	T Wetzel.	552 Montgomery St
Mides G & S M Co.	Nevada.	3.	25.	Dec 16.	Jan 22.	Feb 10.	T W Nowlin.	230 Montgomery St
Mexican G & S M Co.	Nevada.	33.	25.	Jan 4.	Feb 9.	Mar 2.	C E Elliot.	309 Montgomery St
Mountain Tunnel G M Co.	California.	34.	15.	Jan 25.	Feb 28.	Mar 23.	A B Paul Jr.	Safe Dows Bldg
Mayflower G M Co.	California.	25.	25.	Jan 19.	Feb 28.	Mar 18.	J M Izio.	328 Montgomery St
North Bolle Isle M Co.	Nevada.	11.	50.	Jan 12.	Feb 15.	Mar 9.	J W Pew.	310 Pine St
Nevada Queen M Co.	Nevada.	1.	30.	Jan 11.	Feb 8.	Mar 3.	H Deas.	309 Montgomery St
Nevado M Co.	Nevada.	16.	30.	Jan 10.	Mar 3.	Mar 10.	J W P W.	310 Pine St
N Banner Con T Co.	California.	16.	08.	Jan 1.	Feb 5.	Feb 26.	T J Mitchell.	Grass Valley
Overman S M Co.	Nevada.	57.	30.	Jan 21.	Feb 25.	Mar 18.	G D Edwards.	414 California St
Orleans Con M Co.	Nevada.	1.	05.	Dec 6.	Jan 12.	Feb 2.	J Stadfield Jr.	419 California St
Pennsylvania Con M Co.	California.	5.	01.	Jan 4.	Feb 7.	Mar 1.	M Byrne Jr.	Grass Valley
Phonix Con M Co.	California.	1.	60.	Dec 6.	Jan 10.	Jan 31.	C Colburn.	516 California St
Pneumatic M Co.	California.	2.	20.	Jan 4.	Feb 14.	Mar 8.	H F Chior.	320 Sansome St
Sierra Nevada S M Co.	Nevada.	87.	25.	Jan 4.	Feb 9.	Mar 1.	E L Parker.	309 Montgomery St
Yosemite Queen M Co.	California.	2.	02.	Dec 4.	Jan 11.	Feb 1.	H C De Landresse.	628 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Christy M Co.	Utah.	G. R. Spilney.	310 Pine St.	Special.	Jan 23
Cibola Creek M Co.		W. Willis.	309 Montgomery St.	Annual.	Feb 7
Gold Lead G & M Co.		P. H. Flynn.	425 Montgomery St.	Annual.	Feb 8
Gray Eagle M Co.		T. Wetzel.	552 Montgomery St.	Special.	Jan 31
Hatway H G M Co.		J. H. Moore.	628 Montgomery St.	Annual.	Feb 8
Holmes M Co.		C. E. Elliot.	309 Montgomery St.	Annual.	Feb 8
Manhattan S M Co.	Nevada.	J. Crockett.	327 Pine St.	Annual.	Feb 2
William Penn M & M Co.		J. J. Scoville.	309 Montgomery St.	Annual.	Feb 1

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50.	Jan 10
Martin W & M Co.	Nevada.	J. J. Scoville.	309 Montgomery St.	25.	Jan 10
Paradise Valley M Co.	Nevada.	W. Leth Oliver.	328 Montgomery St.	10.	Nov 30
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Jan 15

Mining Share Market.

The stock market has been rather quiet. Hale & Norcross had a slight spurt and the Bodie stocks also had a small rise. A number of old stocks are again being called after having dropped out of sight for years. The recent advance in Comstocks has had the effect of bringing others to the front. The Virginia Chronicle gives the following list of locations around Mount Davidson on which work has been resumed subsequent to November 1, 1886: Keystone, Wells-Fargo, Gladstone, Orleans, Utah, West Utah, Scorpion, William Penn, Miami, Kollinor, North Monte Cristo, Cosmopolitan, Iowa, East Best and Belcher, North Gould and Curry, Gould and Curry croppings, Phil Sheridan, Peytona, Imperial, Bullion, West Potosi, Alpha, Exchequer, Original Gold Hill, Overman, Caledonia, Segregate, Belcher, Confidence, Bullion, Knickerbocker, Silver Eagle, Delaware, North Occidental, Senator Fair, Lady Washington, Silver Hill, Woodville, Succor, Haywood, Silver Star, Dayton, Kossuth, Niagara, Atlantic Consolidated, Golden Prize, Rogers.

The work of development will be inaugurated on the following locations by the middle of February: Sunrise, St. John, Culver, Europa, Julia, New York, Prospect, East Yellow Jacket, Trojan, Keyes, Concordia, Moore and Morgan, East Ophir, East Consolidated California and Virginia, Brophy, Suro, Rocky Bar, Lord of Lorne, St. Louis, Burning Moscow, Watson and a score of others. The Chronicle adds: "It is safe to predict that by the 1st of March the work of development will be in progress on not less than 200 mining locations that have not been disturbed by the miner's pick during the past seven years, except when the annual holding of work required by law was performed."

New York Metal Market.

Telegraphic advices dated Jan. 27th give the following New York prices:

BAR SILVER—\$1.02 1/2 per oz.	
BORAX—3 1/2 @ 6 1/2 c.	
COPPER—Lake—11 1/2 c.	
IRON—No. 1, \$19.00 @ 19.50.	
LEAD—\$4.50.	
QUICKSILVER—\$4 @ 55c.	

The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Dull, spot closing at 11.60. Transferable Notices (Lake) issued at 11.60. Transferable Notices (Chili Bars) issued at 12.39 5/8.

LEAD—Steady at \$4.33 @ 4.50 spot. Transferable Notices issued at \$4.50.

TIN—Quiet at \$22.60 @ 22.70. Transferable Notices issued at \$22.65.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.75 @ 22.90; Billiton Tin, \$23.10 @ 23.40; Banca Tin, \$23.15 @ 23.50; Baltimore Copper, \$10.75 @ 10.95; Orford Copper, \$10.75 @ 11.00; P. S. C. Copper, \$10.50 @ 11.00; Foreign Lead, \$4.75 @ 4.85; Foreign Spelter, \$4.75 @ 4.85.

MAKER'S PRICES—At tidewater, 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$21.00 @ 21.50; No. 2, \$18.50 @ 19.00; Grey Forge, \$17.00 @ 18.00; Hudson River, Grade No. 1, \$20.00 @ 21.00; No. 2, \$18.50 @ 19.00; Grey Forge, \$16.00 @ 16.25; South, Grade No. 1, \$19.50 @ 20.50; No. 2, \$18.00 @ 18.50; Grey Forge, \$17.00 @ 17.50.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Eureka Con., Jan. 25, \$48,000; Germania, 19, \$12,682; 20, \$32,914; Hanauer, 20, \$5220; Moulton, 20, \$18,210; Alice, 20, \$20,400; Hanauer, 21, \$2590; Alice, 22, \$10,242; Hanauer, 22, \$2570; Bannock, 20, \$3625; Hanauer, 23, \$2580; Germania, 23, \$3318; Stormont, 19, \$3260; Con. Virginia and California, 23, \$13,000. Last week Wells, Fargo & Co., shipped from Salt Lake City in bullion, \$70,703; McCormick & Co., \$34,562; T. R. Jones & Co., \$62,294; and Union National Bank, \$12,370.

The Anaconda smelter consumes 180 tons of coal and 125 cords of wood per day.

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OWING to the crowded state of our columns this week in publishing our annual mining review, we are unable to give place to the account of the pleasant reception of Irving M. Scott, of the Union Iron Works, by the employees, on Wednesday evening.

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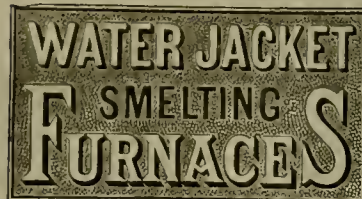
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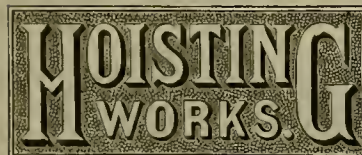
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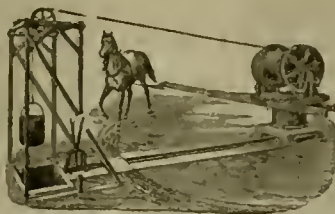


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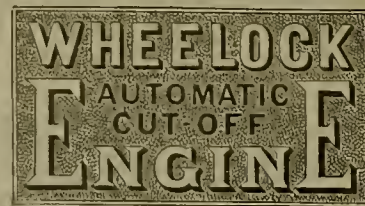
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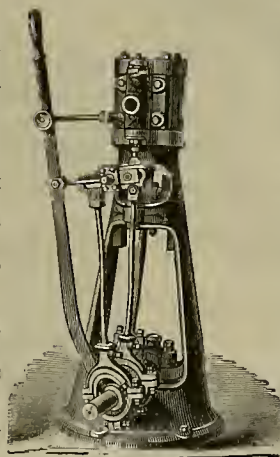
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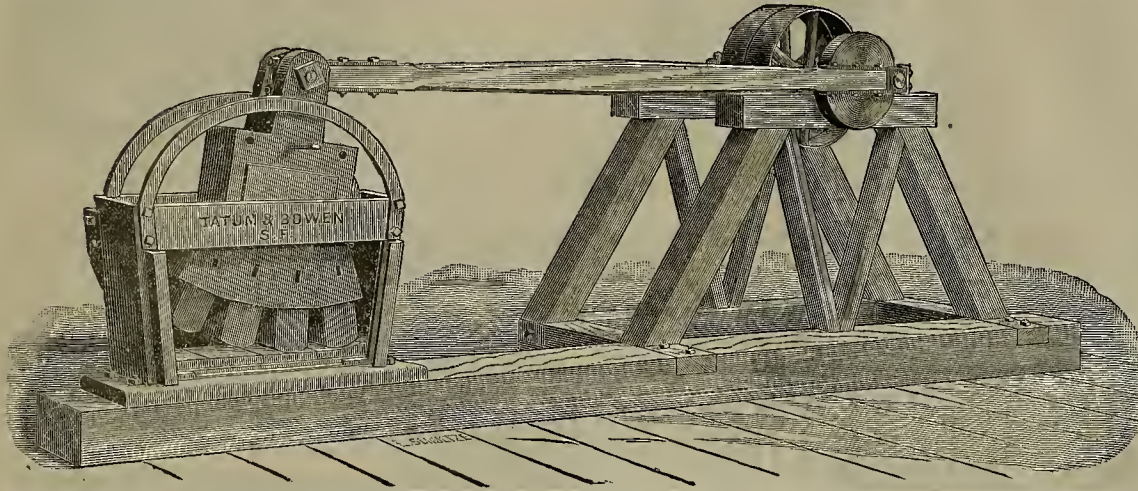
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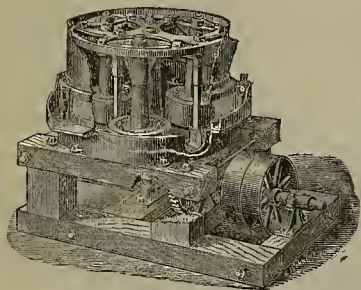
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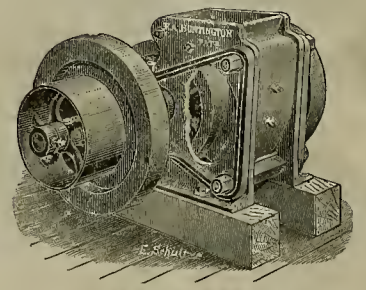
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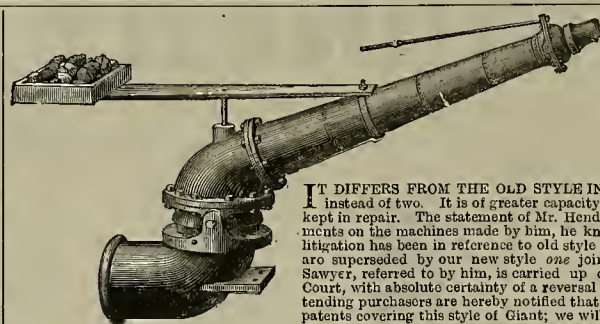
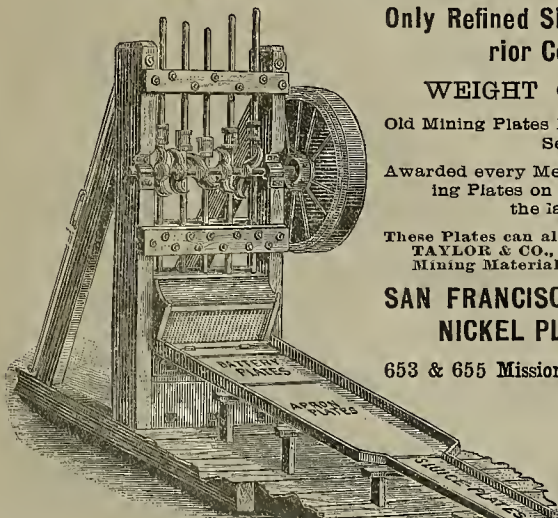
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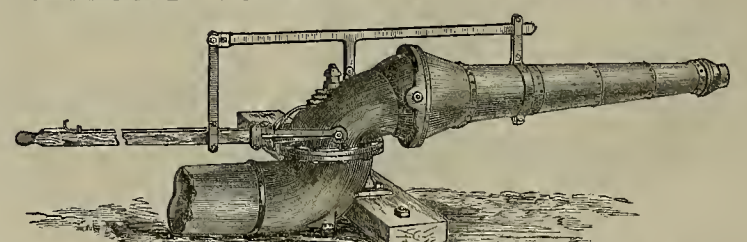
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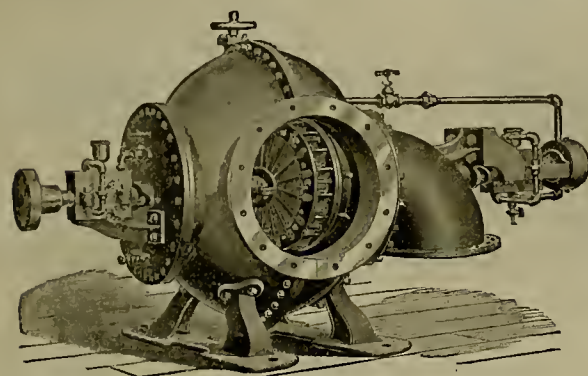
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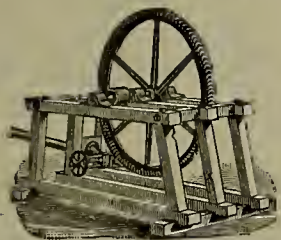


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COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.



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Mining Assessments.

During the past year, so far as the record has been kept, there were 86 mines in the Pacific States and Territories upon which assessments were levied, the aggregate number of assessments being 143 and the total sum called for was \$3,024,674. In 1885 the number of mines assessed was 105, the number of assessments being 162, and the total amount \$2,701,150. In 1884 the amount was \$4,724,700; in 1883, \$5,885,784; and \$7,630,000 in 1882.

The mines assessed in 1886, the number of assessments levied, and the amount called for by each mine, were as follows:

Mines.	No.	Amount.
Alpha Con.....	1	\$15,000
Alta Con.....	2	51,573
Andes.....	3	37,500
Bed Rock.....	1	5,000
Baker Divide.....	2	5,000
Belcher Con.....	1	3,000
Belle Isle.....	2	20,000
Belmont.....	1	7,500
Benton Con.....	2	15,924
Best & Belcher.....	3	162,000
Bodie Con.....	1	50,000
Bodie Tunnel.....	2	4,000
Buchanan.....	1	7,500
Bullion.....	1	15,000
Calcedonia.....	1	15,000
Champion.....	3	9,000
Chollar.....	4	224,000
Columbus Con.....	1	50,000
Con. Amador.....	2	12,000
Con. Imperial.....	1	10,000
Con. Pacific.....	1	9,000
Crocker.....	2	50,000
Diana Gold.....	1	25,000
Dudley.....	1	12,500
East Mt. Diablo.....	1	10,000
Eintracht Gravel.....	2	10,000
Excelsior Water & Mining.....	1	75,000
Excelsior.....	1	20,000
Eureka Con.....	3	150,000
Forty-nine.....	2	4,500
General Lee.....	1	1,000
Golden Fleece Gravel.....	4	65,000
Golden Jacket.....	1	15,000
Goodshaw.....	1	25,000
Gorilla.....	1	3,000
Gould & Curry.....	4	178,200
Grand Prize.....	1	40,000
Hale & Norcross.....	5	280,000
Hathaway Hydraulic.....	1	15,000
Independence.....	1	20,000
Indian Springs Drift.....	1	5,000
Johnson Gravel.....	2	4,000
Justice.....	1	10,500
Lady Washington Con.....	1	1,157
Liberty Hill Con.....	1	7,500
Live Oak Drift.....	2	5,000
Loretta Mill.....	1	4,000
Lucky Hill Con.....	1	5,000
Mayflower Gravel.....	4	30,000
Martin White.....	1	15,000
Mexican.....	2	50,400
McMillan.....	1	6,000
Mt. Cory.....	1	50,000
Mt. Como.....	1	5,000
Mt. Rose.....	1	1,500
Mountain Tunnel.....	1	2,000
Navajo.....	2	55,000
Nevada.....	1	50,000
New Coso.....	1	20,000
North Belle Isle.....	2	35,000
North Peer.....	1	2,000
Oceidental.....	2	32,000
Omilak.....	1	5,000
Ophir.....	2	55,440
Overman.....	1	17,030
Palmas.....	1	2,000
Panelata.....	1	15,000
Pear.....	3	30,000
Peerless.....	4	115,000
Pilgrim.....	1	1,000
Pneumatic.....	1	2,500
Polar Star.....	2	10,000
Potosi.....	5	201,600
Rainbow.....	1	15,000
Savage.....	2	112,000
Scorpion.....	1	10,000
Sierra Nevada.....	3	75,000
Silver Hill.....	1	10,500
Silver Lining.....	1	10,000
Spring Valley.....	1	25,000
Tryolene.....	1	3,000
Union Con.....	3	75,000
Utah.....	2	20,000
Virginia Creek Hydraulic.....	1	1,000
Wm. Penn Con.....	1	2,000
Yellow Jacket.....	1	90,000
Totals.....	143	\$3,024,674

The foregoing assessments, summarized, show the following distribution, as compared with 1885:

	1885.	1886.
California.....	\$499,100	\$426,500
Nevada.....	1,873,350	2,351,174
Arizona.....	238,000	209,000
Alaska.....	5,550	5,000
Idaho.....	4,000	4,000
Utah.....	4,000	.....
Dakota.....	30,000	.....
New Mexico.....	2,000	10,000
Mexico.....	55,200	19,000
Totals.....	\$2,701,150	\$3,024,674

The following shows the apportionment according to districts:

California—Amador, \$16,000; Butte, \$30,500; Inyo, \$20,000; Los Angeles, \$20,000; Mono, \$104,500; Nevada, \$31,500; Placer, \$107,000; Sierra, \$25,000; Tuolumne, \$15,000; Yuba, \$75,000; total, \$426,500.
Nevada—Elko, \$195,000; Esmeralda, \$175,000; Eureka, \$150,000; Humboldt, \$16,500; Lyon, \$5,000; Nye, \$75,000; Storey, \$1,787,174; White Pine, \$15,000; total, \$2,351,174.
Arizona—Gila county, \$7,000; Maricopa, \$5,000; Pima county, \$197,000; total, \$209,000.
Alaska—Fish River mining district, \$5,000.
Idaho—Custer county, \$3,000; Wood River district, \$1,000; total, \$4,000.
New Mexico—Black Range district, \$10,000.
Mexico—Sinaloa, \$19,000.

TOMBSTONE.—A dispatch from Benson, A. T., dated Jan. 21, says: The Grand Central mining company want about 500 men, so rumor goes, to work in their enormous mines, which have been closed to business for some time. The county is all excitement over this news, and if it is true good times are ahead for the people of this vicinity.

About Obtaining Patents.

Patents are Virtually Contracts.

The Patent Law provides that in case a patent, which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, in order that it may afford him complete protection for his invention during the life of his patent.

Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented to another. This requires an exhaustive search among all the patents in the class to which the invention relates. If, by this "preliminary examination," the improvement is found to have been previously patented, our client will receive, for the small sum of \$5 for the examination, a verbal or written report showing definitely wherein his invention has been anticipated, thereby saving him further expense and perhaps much time, anxiety, etc.

To avoid all needless delay, however, and secure patents at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with \$15 as a first installment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately and forwarded to the inventor for his signature. When he receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order or express receipt for our own fee. The case will then be promptly filed by us in the Patent Office, and vigorously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps.] When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of \$20 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretense of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give up a case so long as there is a chance of obtaining a patent. The Agency charge, including drawings, rarely exceeds \$40, and for this we do all we can without appealing the case.

Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are more satisfactory to the Patent Office than the old cumbersome system of storing up an immense bulk of countless models.

Drawings or sketches, sufficient to illustrate the invention clearly, with a description that will enable us to make a full set of perfect drawings for the Patent Office, is all that we require. A model will answer our purpose as well, however, in cases where the inventor can more easily furnish it.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings oftentimes prejudice capitalists and manufacturers against the invention, while in reality it may be of great value, and would meet with ready sale had it been skillfully, completely and artistically portrayed. In all cases prepared by us, the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken to have the invention fully and clearly shown by different views, so that the improvement will be readily understood by the Examiners in the Patent Office, and comprehended by the public when the patent is granted.

Advantages to Inventors on the Pacific Coast.

The firm of DEWEY & Co. has edited and published the MINING AND SCIENTIFIC PRESS continuously since 1860, a period of 26 years. Few agents, who are still engaged in the business, have had so long-extended practice in patent soliciting. The members of the firm give personal attention to the applications entrusted to their care; and their familiarity with inventions and with local affairs in the Pacific States and Territories, enables them to understand the wants of inventors on this coast more readily and thoroughly, as we believe, than any other agents in America. Thus there is saved a great deal of the time which ordinarily—when distant agents are employed—is wasted in preliminary writing back and forth.

This happy combination of long business experience together, and wide connections, has placed our firm in a position unquestionably most fortunate for affording inventors prompt and reliable advice, and the best facilities for securing their full patent rights with safety and dispatch at uniformly reasonable rates.

Every patentee of a worthy invention is guaranteed the gratuitous publication of a clearly-stated and correct description of his invention, in one or more of our influential and reliable newspapers, affording just the circulation best calculated to widely inform the class of readers especially interested in the subject of his invention.

Caveats.

A caveat is a confidential communication made to the Patent Office, and is therefore filed within its secret archives. The privilege secured under a caveat is, that it entitles the inventor to receive notice for a period of one year of any application for a patent subsequently filed, which is adjudged to be novel and is likely to interfere with the invention described in the caveat, and the inventor is then required to complete his application for a patent within three months from the date of said notice. Caveat papers should be very carefully prepared. Our fee for the service varies from \$10 to \$20. The Government fee is \$8 and additional. To enable us to prepare caveat papers, we require only a sketch and description of the invention.

Rejected Applications.

Inventors who have rejected cases (prepared either by themselves or for them by other agents) and desire to ascertain their prospects of success by further efforts, are invited to avail themselves of our unrivaled facilities for securing favorable results. We have been successful in securing Letters Patent in many previously abandoned cases. Our terms are always reasonable.

Inventors doing business with us will be notified of the state of their application in the Patent Office whenever it is possible for us to furnish such information.

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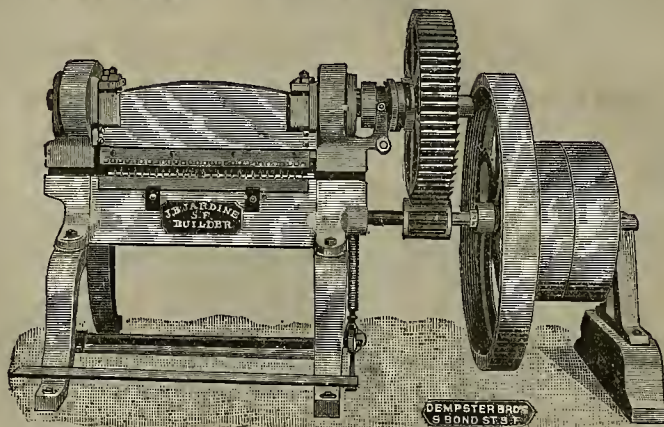
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Power applied direct. Works Ore at Low Cost. More or less weight on Crushers as desired.

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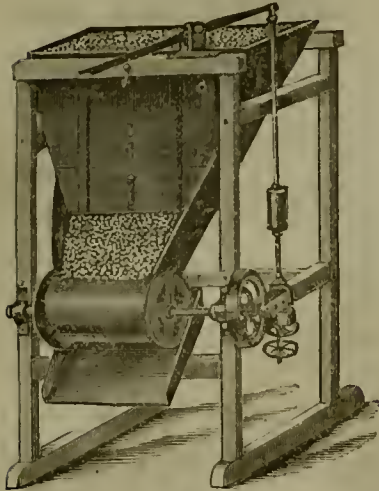
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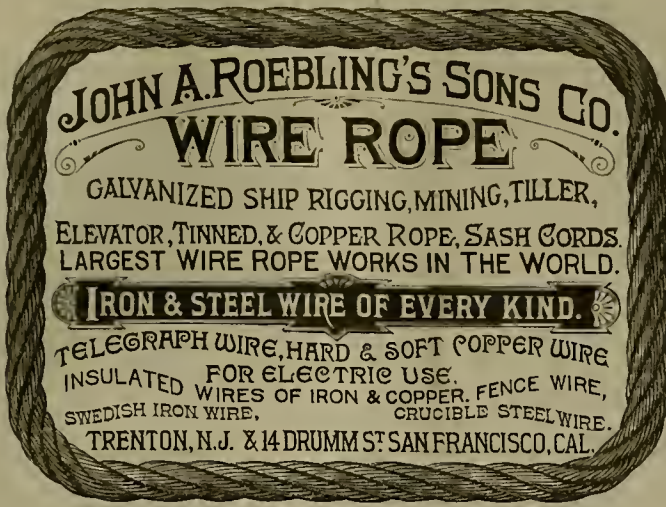
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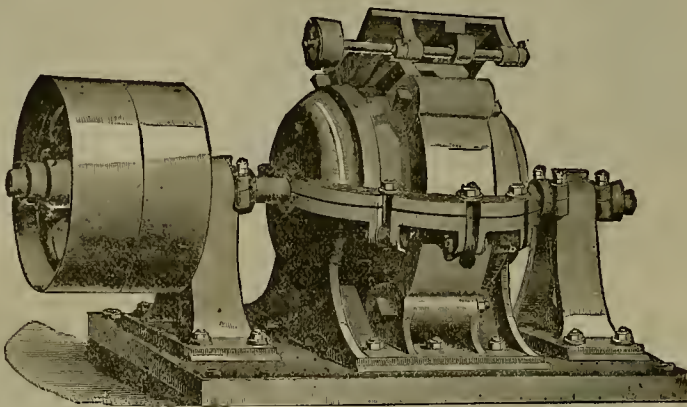
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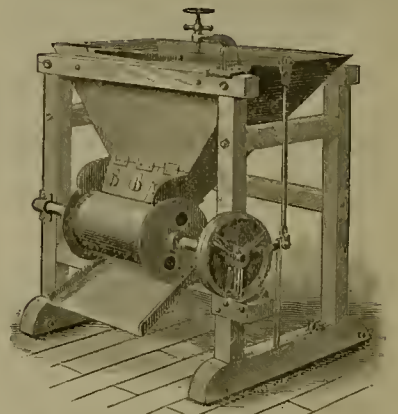
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This form of Ore Feeder is well adapted for its peculiar work.

In reference to a similar form of "Roller" Feeder, which is being manufactured and offered for sale in this city, and of which a cut appears in this journal, we have to say that the Superintendent of the Bunker Hill Gold Mining Company states that the "Challenge" is far superior to the "Roller," he having had both of them operating side by side. We shall be pleased to show this letter, upon application, to any one interested.

We are also manufacturers of the "Challenge" and "Stanford Improved."

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ORE FEEDERS.

We direct attention to an advertisement, which appears in our journal, of the "Original Roller" Ore Feeder, manufactured by the "Joshua Hendy Machine Works," of Nos. 39 to 51 Fremont St., this city.

As the manufacturers of a similar form of Feeder, known as the "Templeton Roller," claim that it is superior to any other style, and cite those in operation at the "Bunker Hill" mill in Alameda county, we expressly contradict the statement, and in substantiation submit a copy of a letter shown to us by a representative of the "Joshua Hendy Machine Works," which speaks for itself.

BUNKER HILL GOLD MINING CO.,

AMADOR CITY, CAL., July 12, 1886.

To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: We have used the "Challenge" and "Roller" or "Templeton" Ore Feeders in our mill for the past three years, and I am free to say that I consider the "Challenge" far superior to the "Roller" Feeder, in that most important of all things in a quartz mill, namely, the regular feeding of ores to the batteries. If the "Roller" Feeder is regulated to feed finely pulverized ore, the coarser ore will choke the outlet of the Feeder, and no ore can reach the batteries. If, on the other hand, it is regulated to feed coarse ore, then the fine ore when it comes will sluice right through and fill the batteries. The "Roller" Feeder requires constant attention. Yours truly,

(signed) N. W. CROCKER, Supt.

SAN FRANCISCO, Jan. 3, 1887.

To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: Having used four (4) of the "Roller" or "Templeton" Ore Feeders, built by the Golden State and Miners' Iron Works, of this city, for more than a year last past, in the Bollo Gopher Mill, in El Dorado county, this State, and being acquainted with the superior principles of construction and the operations of the "Challenge" Feeder built by yourselves, I unhesitatingly indorse the statements made by Mr. N. W. Crocker, Superintendent of the "Bunker Hill" Gold Mining Company, under date of July 12, 1886, as to the irregularity of the feed of the "Roller" or "Templeton" Feeders under the conditions of use which his names, and I am very truly yours,

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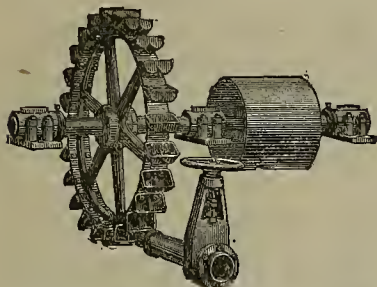
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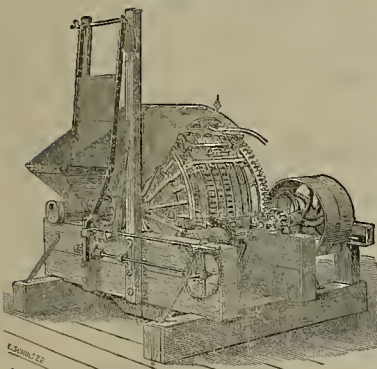
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This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works,
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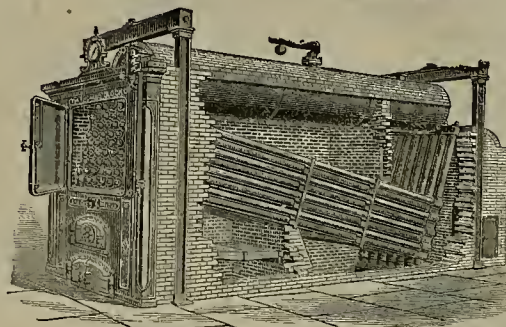
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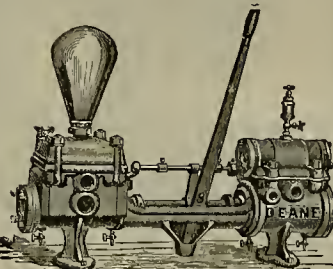
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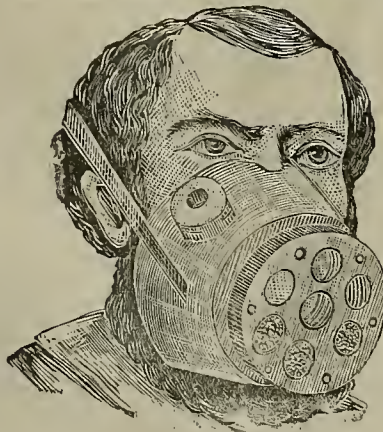
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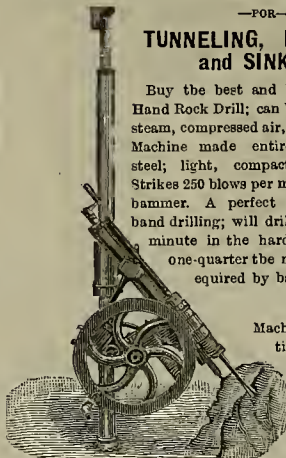
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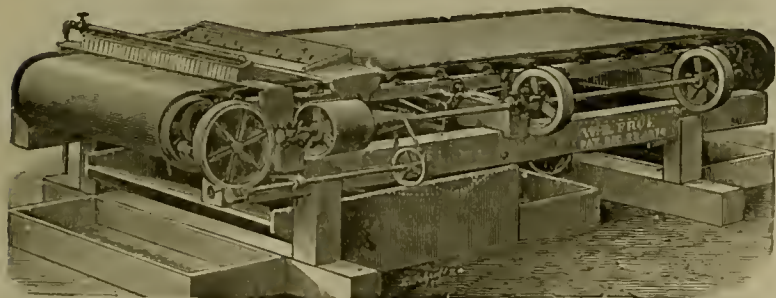
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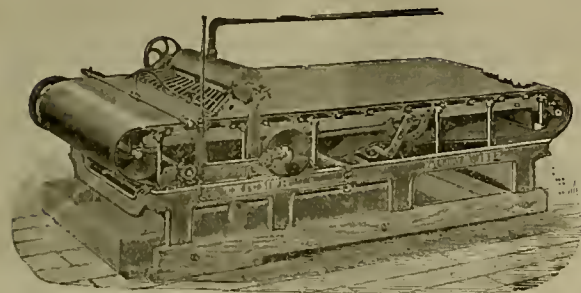
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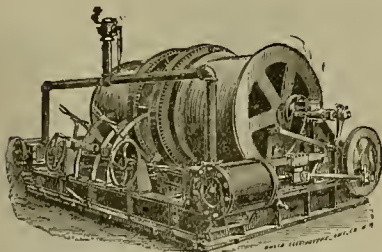
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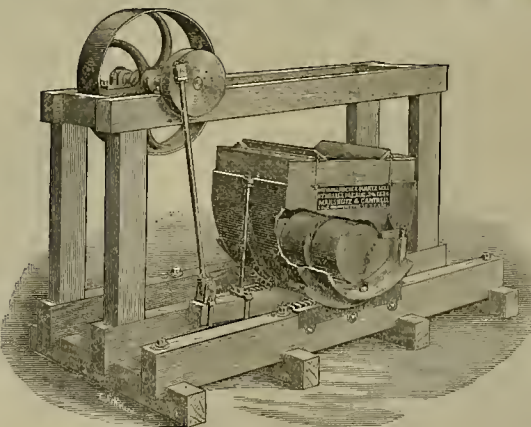
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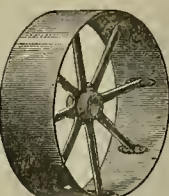


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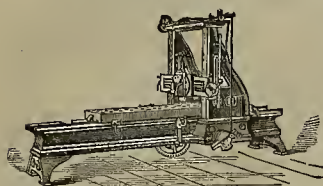
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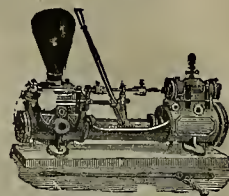


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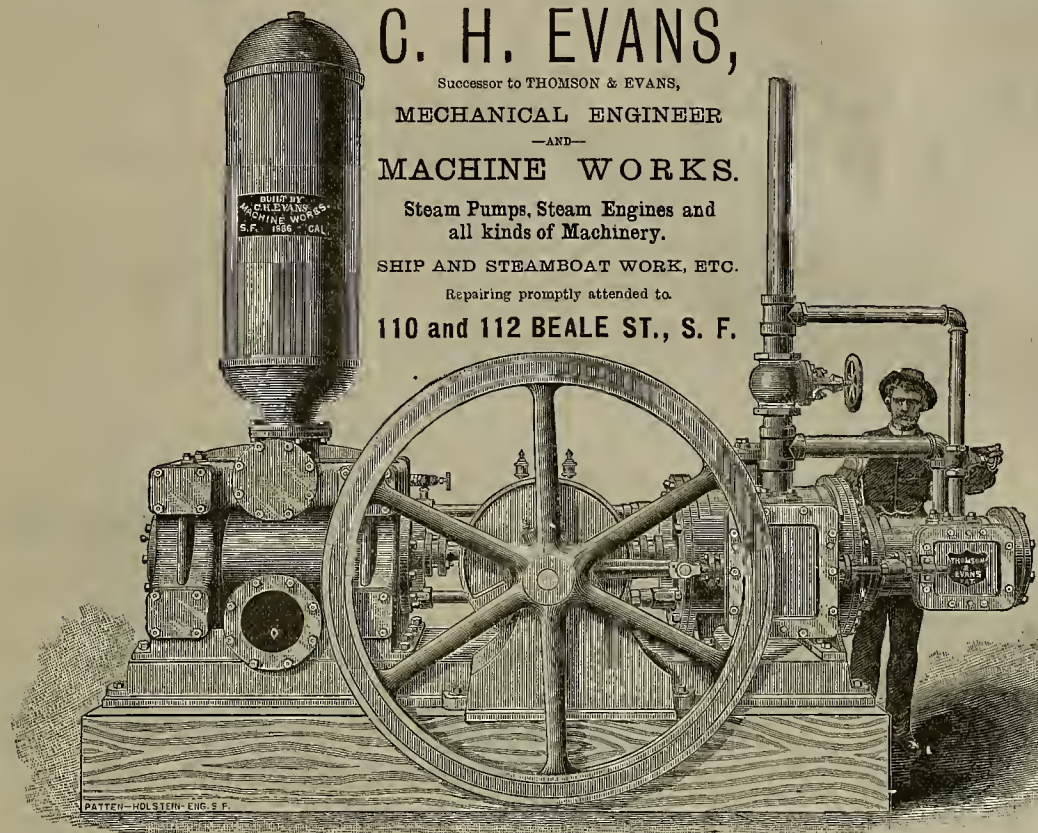
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Besides my recommendation for this particular pump here, I wish to add my commendation of the merits of the pump you put in the engine house at the Presidio, San Francisco, a few years ago, while I was stationed there. At that time I made critical tests of its capacity, and do not hesitate to say that it is the best and most economical pump that I have ever come across in the course of a long experience.

I inclose you a letter from our Chief Engineer, showing what he personally thinks of the pump you sent to this depot. Yours truly,

ED. W. HEWITT, Chief Clerk.

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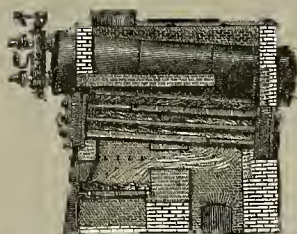
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SAN FRANCISCO, SATURDAY, FEBRUARY 5, 1887.

VOLUME LIV.
Number 6.

Saving Floured Quicksilver.

As recently stated in the PRESS, experiments are being carried on in Nevada, in the direction of recovering the floured quicksilver and amalgam in the sands of the bed of the Carson river. These sands are mainly tailings from the quartz mills near by, and are the accumulations of years. When it is remembered that from one to three pounds of quicksilver are lost with each ton of ore worked, and that this quicksilver carries off some of the precious metals with it, one can see how much wealth lies in the river. The question is, how to recover this.

A company has been formed to dredge the river and to work these tailings; and experiments are being made to prevent any more such loss as that described, by collecting the floured quicksilver before it passes off with the tailings.

A representative of the PRESS visited the Pacific Iron Works in this city last week and met Dr. J. H. Rae, who is the inventor of the apparatus and process designed to save floured quicksilver. He demonstrated the general plan by a simple experiment, witnessed by several persons.

An ordinary gold-pan was nearly filled with the material taken from the river-bed and water added. The two poles of a battery were then connected with the material, and it was left standing a short time. The material was then panned out in clear water, and an ounce or more of mercury, apparently containing some amalgam, was the result. Very little "floured quick" could be seen around the edge of the pan. Then a pound or so of the same material was panned down, in another pan, without being treated by electricity. The whole edge of the pan was found to be white with the floured mercury, but it would not consolidate in a mass as when treated by the electricity.

As a laboratory experiment, this shows conclusively that the treatment by electricity has the effect of bringing the floured particles together in a mass of sufficient specific gravity to admit of saving it. The thing now to be done is to carry out the same plan on a practical scale. An apparatus to do this is being built at the Pacific Iron Works, and is the invention of Dr. Rae. It is an ordinary amalgamating pan or tub, within which the usual rotary

muller or settler-arms are operated. It is so arranged, however, that a current of electricity is applied through the mass of pulp or tailings under treatment.

In order to overcome a certain amount of resistance to the electrical current which is developed in the water, certain chemical substances are added. The strong current of electricity which is passed through the material results in aggregating or bringing together the fine particles of floured quicksilver which are usually lost or carried away in the water, because it is impossible to unite them by ordinary means into a body large enough to be collected.

The Tehachepi Loop.

Tehachepi, 120 miles from Los Angeles, is the highest point on the railroad (3964 feet) between San Francisco and Los Angeles, and is the name of the coming together of the mountains of the Sierra Nevada and the Coast Range. Between Tehachepi and Caliente, 26 miles further west, is the famous "loop," considered by surveyors and civil engineers as one of the most remarkable specimens of railroad engineering in the world, the peculiarity being that the road, in climbing the elevation, is made to cross itself. Its exact location is 352 miles from San

lowed elsewhere. It was claimed by some German engineers that they had used it first. Still investigation proved that their work was commenced after this was completed, which virtually settles the question of priority.

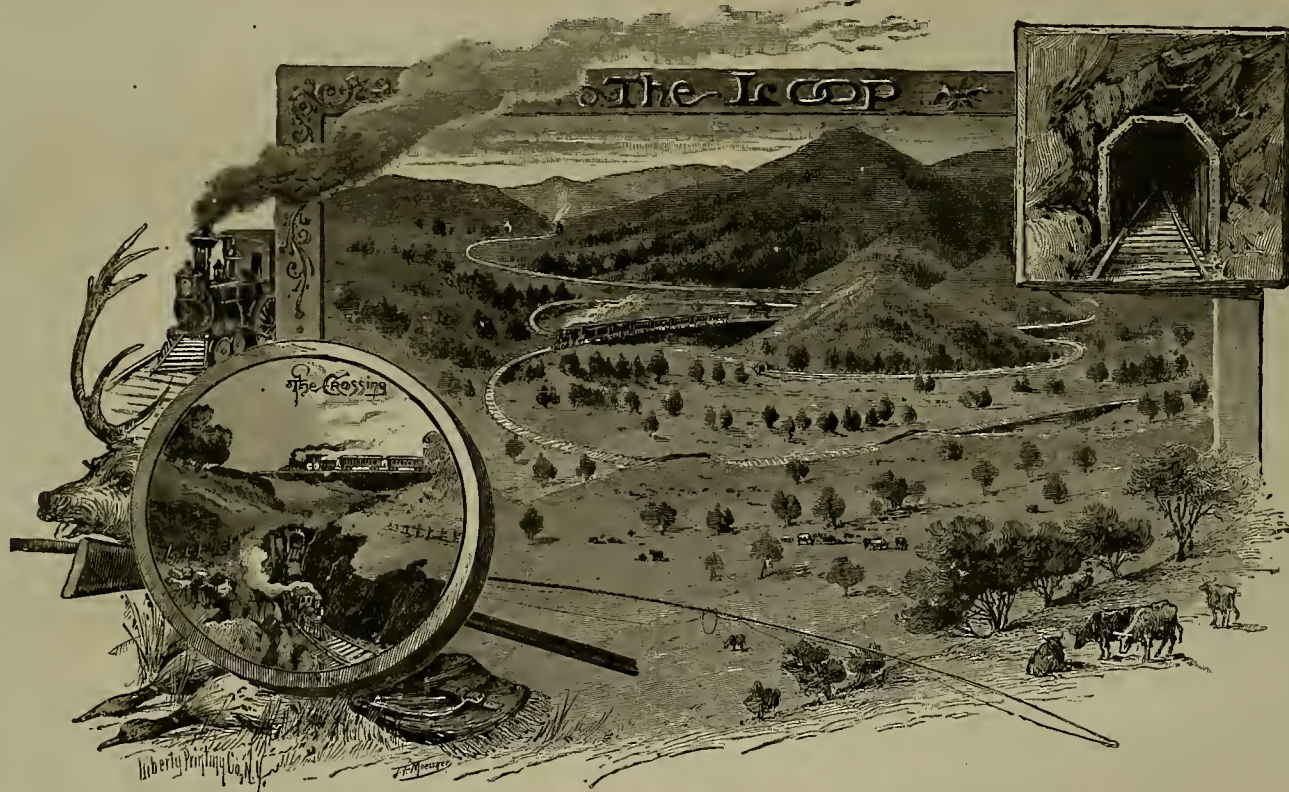
In the construction of railroad on this coast in the mountainous regions, many problems were met and solved by the engineers which were new in railroad work. This is but one of them. Most of them seem simple when the results are seen, but in the designs and construction great skill and genius have been shown. Obstacles were met and overcome, which, in some places, would have been considered insurmountable.

There were not very many choices of routes, however, so that the engineers had to do in some way what was required of them. Their work speaks for itself, and all who have ever had occasion to examine it critically speak in the highest terms of the engineering skill displayed.

IRON continues very firm. The advance East has led some manufacturers to draw on Great Britain, and several heavy purchases are reported. One is for 100,000 tons to be laid down in New York at \$19 per ton, tide-water delivery. The purchaser was a manufacturer of pipe. Nails are rapidly rising in sympathy with this advance in iron. A local circular says that the advances made in metals in the American and British markets are fully sustained, and are now being more sensibly felt here. Consumers generally are carrying full stocks for immediate requirements, but the stocks in first hands are materially diminishing. This, combined with the light shipments afloat, should lead to better figures in the near future.

The past year was not a big one in the way of mining in Beaver Co., Utah, and yet in some directions good progress was made. The town of Frisco, once so full of life in the palmy days of the Horn Silver mine, has been very quiet since the big cave in the lower levels of the Horn Silver mine, 23 months ago; there has been an average of probably 35 men employed.

THERE is a bill before the Nevada Legislature to encourage prospecting and developing mineral resources by giving a bounty.



THE LOOP IN THE SOUTHERN PACIFIC RAILROAD, AT TEHACHEPI, CALIFORNIA.

These particles are brought together either by attraction or some other reason. The apparatus referred to will soon be placed in the Douglas mill and practical experiments made with it on a scale sufficient to demonstrate its usefulness. It is the intention to introduce the system in the ordinary mill process in order to prevent the waste of quicksilver and amalgam which goes on under the present condition. Thus far Dr. Rae is only confident that experimentally the system is a success. How it will work practically in a mill remains to be seen. This question will soon be answered, however, and when the results are accomplished we shall give the details of the trials.

OIL WELL No. 6, at Puente, caught fire the other day and the derrick, engine and other machinery were all burned and the well itself destroyed. Loss about \$25,000.

THERE are about 3000 hands employed in the drift mines of this State, the annual product of which amounts to about \$5,000,000.

Francisco, or 130 miles from Los Angeles. The length of the loop is 3795 feet; lower elevation at tunnel 2956 feet, and upper elevation, at grade over tunnel, 3034 feet; difference in elevation, 78 feet. The engraving on this page (from Major Truman's book describing the Sunset route of the Southern Pacific Co.) shows the general features of the loop, the entrance to tunnel and the crossing.

It is interesting to note in connection with this engineering feature that the plan has since been adopted abroad, and in Germany they now have several examples of the same kind of railroad work.

It has been erroneously claimed that the foreign engineers originated the idea and that the California "loop" was simply a repetition. This is not so. Inquiry at the engineering department of the railroad company here develops the fact that this Tehachepi loop was the first one of the kind ever made, and the plan was devised and carried out by the engineers of the company. Since then many engineers have examined it, and, as stated, the plan has been fol-

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

The Old Belt Mining District, Montana.

[From our Travelling Correspondent, R. G. HUSTON.]

During this past year there has been quite a revival in the old Belt mining district, Meagher county, Montana. It is located 25 miles east of Helena. One reason for the renewed interest aroused is that a company of Michigan capitalists have bought all the individual interests in the two drain-ditch companies on Trout creek. They have, during the past season, built some immense reservoirs to hold the water of the main creek, and are intending to boom the creek out to headrock by turning immense bodies of water down it. They have all the necessary preparations made, so that on the opening of spring they will commence active operations, and the success or failure of the scheme will not be long delayed. The supervision of the project is attended to by Mr. Spratt. At this time of my visit he was East, and what I learned of it was from outside parties. I cannot say that I am envious of their succeeding, but will wish them well, at any rate.

The quartz interests have been revived, and a number of very flattering locations have been made. A Philadelphia company fell by the wayside in this camp for some \$250,000 or \$300,000, and a number of individuals fell for smaller amounts, which virtually killed the camp. One by one all the mills were moved away, but a few of the old-timers remained in this country. Among them were George Clarke and Valentins Heinrich. They were prospecting this past season along with Messrs. Dougherty and Stevens, and concluded they would spend a short time among these old hills that were so eagerly sought and sold so many years ago.

Their first location was the Golden Messenger, in Brown's gulch, about one and one-half miles from the old placer mines, in New York gulch, also a tributary of the main Trout creek.

They have traced this ledge for over 1000 feet on the surface and have sampled it in many places. Ore has averaged from \$12 to \$21 per ton in free gold. The size of the ledge varies from 18 inches to 4 feet. They are now hard at work sinking on the property, and if the prospect continues good as at the present, until spring opens, they will be well satisfied with their year's labor, and will then fix themselves to handle it in good shape.

The Little Dandy is another location near by, and is owned by the same parties. This is in a granite formation and is a ledge 3½ feet in thickness. An average assay taken from this 3 feet from the surface, and across 3½-foot ledge, went \$10. A number of assays have been obtained from choice portions, running as high as \$150 to the ton. This is all free-milling ore, and fine prospects can be obtained by pounding up in a mortar and the old pan process. They have a number of other locations here, among them the Assayer's Delight, but the first two mentioned will receive their attention first in the line of development.

In the old Upper New York district they made a discovery on the opposite side of the gulch from where the Gold Mountain lode that the Philadelphia Co. squandered \$50,000 on, was located. This is a contact vein between slate and granite, carrying a width of from 18 inches to 2 feet; average assay of full width return \$35 gold and 2 oz. silver. It is a strong, clear-cut vein; dips to the north at an incline of 40° and is running parallel with the gulch. It can be easily traced on the surface for 4500 feet along the ridge.

This is the case of an old camp turning into a new one, and I would not be surprised to hear of very favorable results from some of these locations. The camp had run to eolow an old Uncle Samuel has taken away their mail facilities, and now their nearest post-office is Cregar Ferry, some 12 miles up the river from there. The poorest wish I have for them is that they may regain and hold their population of 1867.

Leaching Ores.

EDITORS PRESS:—In reading the very interesting and useful articles on leaching silver ores, by Mr. C. A. Schenck, I observe that the floating hose for drawing off the silver solution was found to work too slowly.

I venture to say that I see no reason why a floating hose may not be made to work as rapidly as may be desired, but the diameter of the vat should be at least equal to the depth to the point of insertion of the hose. By a proper arrangement of the float, the liquid may be drawn at any desired depth below its surface. The hose may be of any required diameter, even to a foot or more, but, if much over two inches, it should be made with coiled wire between its layers, in order that it may not kink or collapse.

We are not informed as to how the joint in the iron pipe, used at the works described, is made and kept tight. Perhaps there is no great difficulty in this, but I think I should prefer the hose as being safer. For the rest, the pipe might be arranged with a regulating float quite as well as the hose; either is better than the

series of plugs or pipes at different levels used in some works. In regard to plugging the holes through which the solution flows from the trough to the precipitating vats, I have found the best arrangement to be to have a short piece of lead pipe (nipples) fixed in the holes, and to use a wooden plug with a *thimble*, consisting of a couple of inches of rubber hose into which the tapered end of the plug is firmly driven. This thimble may be tapered, if necessary, by shaving with a sharp knife. With a little tallow on the thimble, a perfectly tight closure may be made by hand pressure, hammering the plug being needless. C. H. AARON.

Nogales, Jan. 24, 1887.

The Big Patent Fight.

The argument in the great telephone cases has commenced in the Supreme Court of the United States, and will continue two weeks. This records in this case have grown to an enormous proportion. There is now before this court 15,000 pages of printed matter, besides voluminous briefs. An unusual interest attaches to these suits and the final result will be waited for with solicitude. The general question at issue is the validity of the Bell patents, between the American Bell Telephone Company and its dozen or more opponents and competitors. The Government case, known as the Pan-Electric case, contains no material point not included in the cases now on argument. These cases consist of five appeals from decisions of the United States Circuit Court, favorable to the Bell Company. These decisions were made in Massachusetts, New York and Pennsylvania, and are known as the Dolbear, the Molecular, the Clay, Drawbaugh and Overland cases. The appeals are to be argued as one case. It may be of interest to some of our readers briefly to summarize the grounds of these appeals:

First—That the claim that the Reis instrument was a perfect operative telephone, acting upon the microphonic principle, and therefore a full and complete anticipation of the Bell patents.

Second—That the Reis instrument, while not a perfect operative speaking telephone, yet was an instrument designed for and capable of transmitting by electricity musical tones at least; and as such defining the state of the art, and therefore limiting Bell's claims to the instrument shown in the patent alone.

Third—That the instruments described in the Bell patents are inoperative as a speaking telephone, and that therefore his patent, so far as it is said to cover a telephone, is void.

Fourth—That Bell got his patent by fraud, and that it is therefore void.

Fifth—That the principle sought to be covered is not patentable, and that the patent, therefore, be limited to the device shown.

Sixth—That the instruments made by Drawbaugh were in existence before March 10, 1876, the date of Bell's first patent, and were therefore an anticipation.

Seventh—The Dolbear defense admits the validity of the Bell patent, but claims that Dolbear's machine works on a different principle, and therefore does not infringe.

All but one of these appeals assails Bell's first patent, that of March 10, 1876. This patent might be broken down by the Supreme Court and the second patent of January 30, 1877, still hold the field against all comers. It is claimed that the Drawbaugh instruments contain all the elements of Bell's second patent, and were in existence before Bell secured his last patent. In that case this huge telephone monopoly will be broken down and competition left open to half a dozen patents, a "consummation devoutly to be wished."

The Eastern journals are not very hopeful of relief from this gigantic monopoly. The New York Herald calls attention to the fact that Judges Gray and Lowell have already, in the lower court, rendered opinions favorable to the Bell patents, and that they are surrounded by a host of relatives and friends who are large owners of the Bell stock. The Herald gives the names and addresses and the number of shares of stock claimed to be held by the relatives of these two judges. This does not look favorable for the public welfare. Then it is known that some of these cases are collusive, and are intended to uphold the Bell patents. Have the people, then, no remedy against this powerful and odious monopoly whose existence they have made possible by enacting patent laws? The experience of Indiana shows that State laws restricting rates do not furnish a remedy. The New York Times intimates that it might be well to overhaul and remodel our entire patent system if it will result in putting an end to such monopolies. It says:

The power which the telephone monopolists are exercising was given to them by the people, and it is the people who now suffer under the exercise of it. What will they do if, with evidence of the fraudulent procurement of the patent before them, their agents shall not be able to obtain justice? Surely there will arise a feeling of great hostility toward our patent system, and this feeling will be manifested in legislation. Our patent system should not be overthrown, but the abuse of its privileges by such corporations as the Bell Company exposes it to attacks that may greatly weaken it.

An important discovery of coal oil has been made near Mountain View in the Coast Range mountains. The supply is to be conducted to Mountain View, thence to San Francisco. It is located on S. Weilheimer's lands.

Friendly Demonstration by Mechanics.

Irving M. Scott Serenaded.

Irving M. Scott, of the Union Iron Works of this city, returned this week from Washington, where he has been for the past nine months arranging about getting this contract for one of the Government cruisers. He succeeded in obtaining the contract for Cruiser No. 2, which will be built here. On Wednesday of last week a delegation of the Molders' Union called on Mr. Scott and presented him with an immense floral design, representing a model of the Charleston. The floral ship was over eight feet in length. Mr. Scott, in response to a short address, assured the committee of his goodwill and a desire to do everything in his power to advance the interests of the workmen in his employ.

Shortly afterward the men employed in the other departments of the works, several hundred in number, visited the residence, accompanied by the Second Regiment band, and serenaded Mr. Scott. After the band had played a few airs, Mr. Scott left the members of his family, who had assembled on the portico to welcome the men, and descended to the foot of the steps, where General William H. L. Barnes, in a very happy speech, expressed, on behalf of the employees of the Union Iron Works, their appreciation of his successful efforts in securing to San Francisco and the mechanics of San Francisco, a recognition of their capabilities.

In response Mr. Scott said:

This demonstration in support of the Union Iron Works in their efforts to sustain the industries of this coast fills my heart with joy, nerves my arm and almost makes me feel ready for a fight against all the Eastern manufacturers combined; and if you will stand by the Union Iron Works, and make Cruiser No. 2 a success, you will have a long and prosperous run of work. I am of the opinion that by this time you ought to know which is the real friend of the workman—the men who give you all work and pay you the agreed wage at the agreed time, or the men who give you a regular talk at regular intervals, and never a day's work nor a dollar. Now we have the contract, and upon us will depend whether it is to be a success or not. If you stand by the ship we will all be saved or all lost by her; and if I could tell you the trials and tribulations of the last nine months, you would know how to estimate the value of bringing a million of Government money to this coast and distributing it among the working people of this coast. That money represents the wages of 1000 men at \$3 per day for 325 days, which means the bread and butter to at least 4000 people. That of itself is an important fact. But it means more. It means the establishment of a credit for ability with the Government, and is only the key to unlock the Treasury, and in coast defenses and harbor defenses distribute again in the channels of trade what the Government has gathered from you in the shape of revenue and taxes, which amounts to an annual sum of \$11,000,000. When we asked the Government for this ship we were confronted with three objections:

First—We had not the facilities to build a ship. When the commission appointed to examine the plant of the Union Iron Works reported that it was unequalled in the United States, it settled objection No. 1.

Second objection was, no skilled labor could be had in San Francisco. The building of the caisson for the Mare island dock, which fitted so perfect that not a file or chisel touched it after leaving the works, settled the second objection, and is a matter of record in the archives of the navy.

To No. 3, that no materials could be had on our coast, we took the objection out to the steps of the Capitol, where the piece of steel which you finished in the Union Iron Works stood. And as this was at that time the largest piece of steel they had ever seen, it was a complete and overwhelming answer to their last objection.

And when the bids were opened and the Union Iron Works was lower on the two first cruisers, it answered all the Eastern shipbuilders' questions and burst their brags that no one could compete with them. And now you are on your mettle, boys, and are obliged to stand by us and make that ship beat anything afloat. And this unexpected spontaneous expression of goodwill to-night gives us good cheer; and above the coronet of kings, the power of wealth, or the pride of position, give me the goodwill and hearty support of my fellow-workmen. Thanking you from the bottom of my heart, I wish you a full-round prosperous time and the substitute of arbitration in the place of strikes and persuasion in place of force.

At the close of Mr. Scott's address cheers were given, and the large crowd moved away with flags flying and the band playing "Home Again."

A MINING MACHINE.—The Stockton Mail makes a short mention of a machine conducted on an entirely new principle, centrifugal force being applied for use, on a gravel claim near Campo Seco, in Calaveras county. The machine was started a few days ago and exceeds the expectations of the owners. Four tons of gravel were run through in 10 minutes. It will require the labor of 30 men to supply the material from the claim to keep the machine going. Boulders six or eight inches in diameter, iron, cement and other hard substances are in a flash reduced to powder, and when the machine is in good running order, it will reduce a ton in three minutes. In the estimation of miners the new machine will create a revolution in gravel mining. A machine that knocks iron and boulders into powder in a flash must be built of some new sort of material to stand the wear. The thing that wears such substance must get worn. The Mail's story reminds us of the man who discovered a universal solvent, but was not able to use it because he could get no vessel to hold it.—Ex.

Determined Miners.

They Wanted their Pay before the Mine Shut Down.

A dispatch from Helena, Montana, dated Jan. 27th, says: Advice from Gregory states that this place is in a state of siege, the works having been closed down and the miners having taken possession of the town. Gregory is a mining camp near Wicks, southeast of Helena, where the Gregory Mining Company conducts its milling and smelting operations, giving employment to 300 men. To-day A. J. Selligman, B. W. Child, E. W. Bach and Thomas L. West, all stockholders in or officers of the company, went out to close down the works, the finances of this institution having arrived at such a condition as to make a suspension of operations imperative. The company has been running behind for months, and now some of its wealthy stockholders whose means have been used to carry on the operations have refused to put up any more money. On arriving at Gregory and making known their mission to the men, Messrs. Selligman, Child, West and Bach were promptly taken into custody by the exasperated miners, who have two months' pay due them. The works were immediately shut down and the men took possession of the town. This company's treasury is empty and there is no visible resource on which a draft can be made to obtain sufficient funds to pay off the men. It is learned later that Selligman and Child have been released to come back to the capital and devise means for payment of the back wages. The other two gentlemen are to be held as hostages for their safe return. Meanwhile Gregory is in possession of the miners, who are peaceably inclined and allow no disorderly proceedings. They are determined and were holding the fort persistently at last accounts. The local managers here in Helena are making arrangements to pay the men. It is claimed that if more money had been advanced from New York and a branch road built from the Northern Pacific to the works, the operations would be profitable.

A dispatch dated the following day has this additional information: Drafts for the amounts due the employees had not reached Helena, and the men, fearing that they were to lose two months' wages due, on being notified of the company's intention, called a meeting and took charge of the mine and works. They then went in a body and notified the gentlemen named that they wanted them to attend their meeting in the hoisting works. One hundred and fifty men walking in front, and 175 behind, escorted them to the meeting. Speeches were made on both sides, and the men decided to hold the four gentlemen named until the money was forthcoming. They detailed eight men to guard them during the day and eight men during the night. They voted to close every saloon and detailed men for that purpose, which was strictly carried out. They also appointed a committee to inspect all telegrams and correspondence. Later in the day they decided to allow the general manager to go East to secure the money, at the same time paroling the accountant and foreman, but still holding Mr. Selligman a prisoner for security until the money was paid.

Mr. Selligman telegraphed to his father in New York that if the company did not pay the men he would not answer for the consequences, for the protection of the property or himself. The amount involved was \$75,000, and J. & W. Selligman & Co., owning but a portion of the company's stock, immediately telegraphed the money to Helena for the payment of the men and to release the company's property and Mr. Selligman.

About midnight Mr. Selligman was released, upon a messenger being sent to the men, who guaranteed the money for Selligman & Co. The men treated their prisoner and all parties with the utmost respect and courtesy, and protected the company's property, no disposition being shown to injure any one. Mr. Selligman was paroled and allowed the freedom of the camp, on his word of honor that he would not leave, and that payment of the money would be made to the men. They are being paid off to-day, and all hands are happy over the result of what might have been a serious affair had not the New York bankers promptly stepped in.

QUARTZ MINING.—Quartz mining is the backbone (spinal marrow included) of the prosperity of Nevada county, says the *Foothill Tidings*. Fruits and trees and vines and factories come in and help. They are ribs, as it were, of the structure of prosperity. The vines and trees will take the place of quartz mining when our quartz veins shall have been worked out. That will occur somewhere about 400 or 500 years from now. Our quartz mines make the market for the productions of the trees and vines; a home and cash market. And our quartz mining is a safe and legitimate business. No one wants to stop it; it would not pay the valley people to try to stop quartz mining, and they are not going to try. Therefore, plant all the trees and vines you can. Trees and vines grow well right on the top of our best producing quartz ledges, but when you dig a hole for trees look well into the excavation, for the digging may show you a quartz ledge. That sort of thing has often happened. Do any kind of work and study up the work that will do this section good. Promote and encourage every kind of industry; but while doing so keep your best eye on quartz mining.

Smelting in Colorado.

The old year closed with the smelting industry in far better shape than when it opened. In the summer of 1885 a war between the smelters was begun, which was continuing at the end of the year. Smelters were paying such prices for lead ore that there was little or no profit in the business. The war came to an end when the price of silver declined below \$1 per ounce, and the price for smelting was advanced to a paying, but still low basis. During the early part of the year the competition of the valley smelters outlasted work very seriously at the Leadville plants, and for a time there was talk to the effect that all the smelting would of necessity soon be done in the valley towns, owing to their advantages for obtaining cheap fuel, limestone and cheap freight rates to the East on bullion. But when the Pueblo works drew out of the Leadville market, and the price for treatment advanced, the industry revived at Leadville. It was aided materially by a largely increased output of the mines, and the Leadville plants are now treating about 900 tons daily, making the city the leading smelting point in the State.

One year ago oxidized lead ores, in which the iron balanced the silica, were treated for \$2 per ton, and 45 cents per unit was the price for lead. Ores rich in lead were treated for nothing, and 45 cents per unit paid for lead. Five per cent was deducted from the New York quotations on silver on these classes of ore. The hardest of all ores to treat, the zinc sulphides, containing an excess of silica, were treated for \$15 and seven per cent off from silver quotations. Now, the best ores bring only 40 cents per unit for lead, and this treatment charges vary from \$4.50 to \$5.50 per ton. Now zinc sulphides are treated for \$16 per ton, with a charge of 50 cents for each per cent of zinc over 10.—*Denver Tribune-Republican.*

Snake River Placers.

The Snake river placers are now being advantageously worked, from Eagle Rock for hundreds of miles down the river.

The gold-bearing gravel lies in immense banks, or what were bars when the river was higher and larger than it is now. They extend along the river, with low channels sometimes cutting them in two or crossing them. They vary, therefore, in width from a few feet to as many miles, and in thickness from a few feet to 200.

The only drawback is the extremely small size of the particles of gold; coarse gold is unknown on Snake river, but from Eagle Rock, in Oneida county, to the mouth of the river gold can be found of such exactly similar metallurgical conditions, both as to fineness in grade (shape of grains being scale-like in form) and fineness in character of grains, that it might have come from either end of the river. On the alluvials of this river gold is also found, but even within half a mile of its mouth 'Boise' gold sinks to an assay fineness of from 720 to 780, while that from the river under review will assay over 900, and even 990. The shape of the grains is noticeably a feature of Snake river gold, being so flat and scale-like that the precious metal is often seen floating on the surface of the water, while gold from any of the feeder streams assumes more the character of shot gold, is coarser and much more easily harnessed to the service of man. Its extremely small size is also a distinguishing mark of this gold. Other minerals produced in Idaho are copper, lead, coal and salt. Marble exists along the valley of the Snake, and mica has been found in Washington county and in North Idaho.—*Portland News.*

BUTTE, MONTANA.—The successive copper and silver crises which threatened the prosperity of Butte having happily been triumphantly survived, it may be safely assumed that the future of this district is beyond the pale of uncertainty and bright with the jewels of well-grounded hope. On every side are visible evidences of present and future successful achievements in the mining field. In the early spring the Anaconda will be in shape to produce 5000 tons of copper per month. The erection of another 60-stamp mill is in contemplation by the Bluebird company. The condition of the Mountain View already warrants the building of a 250-ton concentrator and smelter. The Clark's Colusa plant is already inadequate to treat the product even of the mine so named, not to mention a half dozen other copper properties with which the owner is identified. The Clear Grit requires a smelter and can supply a big one with plenty of copper silver ore. The Chambers' Syndicate properties, now undergoing thorough development, will soon rank among the heavy producers. The Goldsmith and Wabash will resume operations within three months. The Josephine, Flag, Cora, Golden Rule and Mountain Chief may be implicitly relied upon for continued heavy contributions to the custom mills, while the Amy & Silvermith, with its dividend record of nearly \$200,000 during the past year and its handsome treasury surplus, can furnish lively occupation to a 20-stamp mill for an indefinite period, even from the present opening.—*Inter-Mountain.*

If you want to make a fortune you must produce something that appeals to the millions, not to the millionaires.—*Jacksonville Times-Union.*

Quicksilver.

The following tabular statement shows the extent of our export trade by sea and the shipments by rail from San Francisco and other points during the year 1886:

MONTHS.	FLASKS.	Value.	MONTHS.	FLASKS.	Value.	MONTHS.	FLASKS.	Value.	MONTHS.	FLASKS.	Value.
January.....	301	\$8,855	July.....	12	\$30	January.....	301	\$8,855	July.....	12	\$30
February.....	638	17,535	August.....	12	\$30	February.....	638	17,535	August.....	12	\$30
March.....	770	21,150	September.....	12	\$30	March.....	770	21,150	September.....	12	\$30
April.....	677	19,258	October.....	12	\$30	April.....	677	19,258	October.....	12	\$30
May.....	977	27,816	November.....	12	\$30	May.....	977	27,816	November.....	12	\$30
June.....	1,032	29,258	December.....	12	\$30	June.....	1,032	29,258	December.....	12	\$30
July.....	1,032	29,258	TOTAL.....	1,032	\$27,816	July.....	1,032	29,258	TOTAL.....	1,032	\$27,816
August.....	1,032	29,258				August.....	1,032	29,258			
September.....	1,032	29,258				September.....	1,032	29,258			
October.....	1,032	29,258				October.....	1,032	29,258			
November.....	1,032	29,258				November.....	1,032	29,258			
December.....	1,032	29,258				December.....	1,032	29,258			
TOTAL.....	1,032	\$27,816				TOTAL.....	1,032	\$27,816			

Includes 500 flasks Spanish in bond, which had been brought here from London on speculation, and valued in the primary market at \$13,710, 1885.

The total number of flasks given for 1885, by sea, includes 100 for South America, valued at \$3900, and 233 for China, valued at \$6930.

The rail shipments (gross) from this State last year, according to the monthly reports furnished by the railroad company, were, in pounds, as follows:

Months.	From.	Pounds.
March.....	San Jose.....	27,000
April.....	San Jose.....	27,000
June.....	San Jose.....	27,000
July.....	San Jose.....	55,350
August.....	San Jose.....	89,550
August.....	San Francisco.....	450
September.....	San Francisco.....	38,000
September.....	San Jose.....	27,000
October.....	San Jose.....	31,500
October.....	San Francisco.....	1,350
December (1885).....	San Francisco.....	11,430

Total..... 335,600
Equivalent to flasks..... 3,730

The production of the California mines in 1886 (December estimated), compared with 1885, was as follows:

Mines.	1885.	1886.
New Almaden.....	21,400	18,000
Edna.....	1,309	3,478
Napa Consolidated.....	2,197	1,709
Great Western.....	3,460	1,949
New Idria.....	1,144	1,144
Sulphur Bank.....	1,295	1,449
Rodriguez.....	385	409
Great Eastern.....	446	735
Varadero.....	302	786
Gudalupe.....	35	.....
TOTALS.....	32,073	29,081

The production for several previous years was as follows: 1884, flasks, 31,013; 1883, 46,725; 1882, 52,732; 1881, 60,851; 1880, 59,926.

CAVE CREEK DISTRICT, ARIZONA.—A correspondent writes from Phoenix, Arizona, that they are experiencing great mining "activity," with almost certainty of three very large sales in Cave Creek district. There will be two very large mills that will equal the Vulture plant within 60 or 90 days. Experts are on the properties from New York, and within 30 days there is promise of two different experts to report on another property, all in Cave Creek district. Material is being hauled from Maricopa, on S. P. R. R., to Gila river (between Phoenix and the railroad), and a very large force of laborers are at work grading; others are at work on the Gila River bridge.

No American city shows for 1886 a better business record than San Francisco. It had fewer commercial failures according to population than any other.

The world owes nobody a living, and is certainly not indebted to a loafer. If the world is a sea full of fish, everybody must work to get them out.

Interstate Commerce.

Important Sections of the New Law by Congress.

The principal provisions of the Interstate Commerce bill, as it passed the Senate and the House of Representatives, are embraced in the following sections:

The first section applies the provisions of the Act to any common carrier engaged in the transportation of passengers wholly by railroads or partly by railroads and partly by water, when both are used under common control, management or arrangement through more than one State or Territory or from any place in the United States to any adjacent foreign country. It defines the term "railroad" to include all bridges and ferries used or operated by any railroad. All charges made for any service rendered in the transportation of passengers or property shall be reasonable and just, and every unjust and unreasonable charge for such service is prohibited and declared to be unlawful.

Section 2 makes it unlawful for any common carrier, subject to the provisions of this Act, to charge, demand, collect or receive, directly or indirectly, from any person or persons, greater or less compensation for any service rendered in the transporting of passengers or property than it charges, demands, collects or receives from any other person or persons for doing him or them a like and contemporaneous service in the transportation of a like kind of traffic under substantially similar circumstances and conditions.

Section 3 makes it unlawful for any common carrier, subject to the provisions of this Act, to make or give any undue or unreasonable preference or advantage to any particular persons, company, firm, corporation or locality or any particular description of traffic. Every common carrier, subject to the provisions of this act, shall, according to its respective power, afford all reasonable, proper and equal facilities for the interchange of traffic between its respective line, and for receiving, forwarding and delivering passengers and property to and from the several lines and those connecting therewith, and shall not discriminate in their rates and charges between such connecting lines.

Sections 4 and 5 (the long and short haul and pooling sections) are as follows:

SEC. 4. That it shall be unlawful for any common carrier, subject to the provisions of this Act, to charge or receive any greater compensation in the aggregate for the transportation of passengers, or of like kind of property, under substantially similar circumstances and conditions, for a shorter than for a longer distance over the same line, in the same direction, the shorter being included within the longer distance; but this shall not be construed as authorizing any common carrier within the terms of this Act to charge and receive as great a compensation for a shorter as for a longer distance; provided, however, that upon the application to the commission appointed under the provisions of this Act, such common carrier may, in special cases, after an investigation by the commission, be authorized to charge less for longer than for shorter distances for the transportation of passengers and property; and the commission may, from time to time, prescribe the extent to which such designated common carrier may be relieved from the operation of this section of the Act.

SEC. 5. That it shall be unlawful for any common carrier, subject to the provisions of this Act, to enter into any contract, agreement or combination with any other common carrier or carriers, for the pooling of freights of different and competing railroads, or to divide between them the aggregate or net proceeds of the earnings of such railroads, or any portion thereof; and in any case of an agreement for the pooling of freight, as before said, each day of its continuance shall be deemed a separate offense.

Section 6 requires that after 90 days from the passage of the Act, every common carrier subject to its provisions shall have printed, and keep for public inspection, schedules showing its rates, fares, and charges, and, in addition to requiring railroads to give publicity at all of their depots on their several lines it gives authority to the commission, where it is proper and necessary, to require them to give publicity to the rates to other places beyond the lines of their several railroads. It also provides that rates, fares and charges shall not be raised except after 10 days of public notice, but that they may be reduced without previous public notice. The notice, however, shall be simultaneous with the reduction itself.

Section 7 makes it unlawful for any common carrier to enter into any combination or agreement to prevent the carriage of freights from being continuous from the place of shipment to the place of destination.

Section 8 declares that any common carrier violating the provisions of the Act shall be liable to any person or persons injured thereby, for the full amount of damages sustained in consequence of any such violation, together with reasonable counsel or attorney fee.

Section 9 provides that persons claiming to have been damaged by the action of common carriers may proceed for the recovery of their damages, either in the courts of the United States or before the commission herein provided for; but not before both tribunals.

Section 10 makes it a penal offense to violate any of the provisions of this Act, and puts the

maximum fine which may be imposed at the sum of \$5000.

The 11 following sections contain the commission features of the bill. They provide for a commission to consist of five persons, whose term of office shall be for six years, except for the first appointments, which are to be for two, three, four, five and six years. The members of this commission are to be appointed by the President, by and with the advice and consent of the Senate. Their principal office shall be in Washington, but they may hold sessions at other places than Washington, and a single member of the commission may take testimony anywhere, as may be directed by the commission. These commissioners are to have salaries of \$7500 each. The commission has power to appoint a secretary, with an annual salary of \$3500, and has authority to employ and fix the compensation of such other employees as it may find necessary to the proper performance of its duties, subject to the approval of the secretary of the interior.

Section 22 provides that nothing contained in this Act shall abridge the remedies now existing at common law or by the statute.

Section 23 appropriates \$100,000 for the purposes of this Act for the fiscal year ending June 30, 1888.

Section 24 provides that the provisions of Sections 11 and 18 of this Act, relating to the appointment and organization of the commission herein provided for, shall take effect immediately, and the remaining provisions of this Act shall take effect 60 days after its passage.

SAN JUAN REGION, COLORADO.—Concerning San Juan, the *Silverton Democrat*, in an excellent review of the situation in its region, says: The quantity of ore shipped from the Silverton depot during the year commencing January 1 and ending December 31, 1886, foots up the comfortable amount of 14,350 tons, whose cash value is \$1,517,550. These figures are as correct as it is possible to get them, having been taken directly from the books of the Stoiber Bros., those of Schnyler & Duyckinck, ore samplers of Silverton, and the books of the Denver & Rio Grande Railroad Co. This is an increase on the output of 1885, notwithstanding the low prices for silver that prevailed during the best business portion of the year. Of all the mines and prospects in the San Juan country, subsidiary to the Silverton market, the output from 18 make up the great bulk of ore shipped during the year. These are the great mines of the district, whose prosperity and permanence are beyond question. The ore of some of these mines is both abundant and high in grade, while in others the grade is quite low, the margin over and above cost of mining, transportation and reduction of each ton being small, the sum of the proceeds being made by large output and the careful and economical management of the mines. Of the other mines that have contributed to the yield of the district, the number is 88.

THE ALICE.—During the past year the Alice company has paid four quarterly dividends of 6 1/2 cents per share of \$25,000 each, aggregating \$100,000 and making the total amount of dividends declared to date \$775,000. The stock is capitalized at \$10,000,000, divided into 400,000 shares of \$25 each. Each share has thus paid \$1.63 1/2 per share, while the plant and property are constantly improving. For the past five years the two mills have treated an average of 35,000 tons of ore per annum, a total during that period of 175,000 tons. In the Alice properties it is estimated that two tons of waste are displaced to one ton of ore. In the five years during which the two mills have been running, therefore, 350,000 tons of waste have been heisted, which added to the ore makes the tremendous aggregate of 525,000 tons of rock that the company has mined or lifted from the Alice and Magna Charta mines. During that time the gold and silver value of the bullion the mills have yielded exclusively from company ore has reached the splendid total of upward of \$6,000,000—enough to pay \$60 each to every man, woman and child in Montana.—*Butte Inter-Mountain.*

THE GRANITE MOUNTAIN MINE.—The ore is a very hard quartz, carrying native and ruby silver and black sulphurets of silver, together with oxide of manganese, antimony, zinc and arsenic. It is treated by dry crushing, chlorination and amalgamation, the milling appliances and method of reduction being very perfect. For the year ended August the average value of the ore treated, according to battery assays, was 177 ounces per ton—a much higher average than that of any other on the continent. For the past year the company has had but 30 stamps in operation, but so rich have been the developments of the past 12 months that a contract was let last summer for the construction of a new mill of 40-stamp capacity, which has just been completed. With 70 stamps dropping, it is designed to treat some of the lower grade of ore of which many thousand tons are blocked out and reserved in the upper workings, and which it is expected will reduce the average battery assays to \$125 per ton; yet it is anticipated by the directory that the gross output will be increased to \$240,000 of silver and \$2500 in gold per month, of which sum the enormous amount of fully \$200,000 will be passed to the dividend or surplus fund.

Gov. STANFORD has purchased the Grogan ranch at Paicines for his stock now at Palo Alto.



A. T. DEWEY.

W. B. EWER.

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A. T. DEWEY. W. B. EWER. G. H. STROM.

SAN FRANCISCO:

Saturday Morning, Feb. 5, 1887.

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Passing Events.

The Legislature is discussing a great many hills of interest at present, among them, that relating to the appropriation for the State Mining Bureau, to which we refer more fully in another column.

The rainstorm that set in on Thursday night is probably extending over a large area. The rainfall, up to the time of our going to press, has been copious, with prospects of several days' continuance, the wind and barometric indications being favorable.

The experiments to which we refer elsewhere concerning the saving of floured quicksilver are of great interest to miners. We are promised full details of the results of the practical trials, which will soon be made.

There are rumors that the famous Spring Valley mine at Cherokee, Butte county, is in financial difficulties and that it will be closed.

The Mount Diablo gold mines, Contra Costa county, about which there was some excitement a few weeks since, have not panned out very well. Some claims were located, but there is little evidence of any paying ore. Many will remember that there was a copper excitement in the same region a long time ago, when several thousand dollars were lost in the vain efforts to make a mine.

The Arid Interior.

The last issue of the MINING AND SCIENTIFIC PRESS contained our usual Annual Mining Review, a paper of 25 columns, embracing a summary of the progress made in the various branches of mining carried on in our Pacific States and Territories. More than two-thirds of this review related to a region that only a few years since was designated on all the maps extant as the "Great American Desert," and which, in a general way, may be said to cover the present Territories of Idaho, Utah and Arizona, that section of Washington and Oregon lying east of the Cascade Range, trans-Sierra and South-eastern California, together with the western half of Montana, Wyoming, Colorado and New Mexico; this region, in the absence of any easily recognized natural boundaries or climatic differences, taking in as much more territory as the imagination of the geographer might choose to include within its limits. In a rough way, it may be said to be bounded by British America on the north, Mexico on the south, the Rocky mountains and the Sierra Madre on the east and the Cascade and the Sierra Nevada ranges on the west. In its most restricted sense this so-called American Desert is, however, marked by very respectable dimensions, being more than ten times as large as all New England and nearly three times as large as the State of California.

Not much was known concerning this great interior basin until about 30 years since, when the California miners in search of the precious metals first visited and began its exploration. Meeting with the objects of their search in many parts of it, this extensive country began to be rapidly populated, the labors of the miners having since been rewarded with such success that more than half the gold and silver, with a large proportion of the lead and copper now produced in the United States, comes from this region. But these industries here are still in their infancy. That the present product of these metals will in the course of the next 10 years be doubled seems probable, some of them having last year increased their output 20 per cent over the largest ever before made. While the area of the metalliferous domain is under more vigorous and well-directed exploration, being all the while enlarged, the ores are at the same time being worked more closely and cheaply, imparting to the future of the mining industry here a very cheerful aspect.

But not only in mineral wealth does this supposed land of sterility turn out to be rich; it shows itself to possess also great agricultural and grazing resources. Much of it is well adapted for farming and stock-raising purposes. It contains more than 1,000,000 head of horses and neat cattle, with sheep and swine in countless numbers, vast herds of these animals being every year slaughtered or driven out of the country. Nearly enough fruit and breadstuffs are raised for home consumption, and of both there will be ultimately some, and perhaps much, to spare. The soil almost everywhere is warm and rich, growing the natural grasses and other stock-sustaining herbage in abundance. Sure and bountiful crops of the cereals can be raised here with the aid of irrigation, and in some places without this aid.

With these many forms of natural wealth so abounding, the name *desert* has come to be generally dropped in speaking of this region. The United States Geological Survey and other explorers in the service of the Government term these the Arid Sands of the Interior, and this is the proper term to apply to them; they are deficient in moisture but not generally in fertility.

But while the rainfall here is limited, averaging hardly more than three or four inches per year, the snow falls every winter to a great depth on the mountains that traverse this arid realm in every direction, the trend of the main chains being northerly and southerly. Between these mountains occur deep, broad valleys, some of which spread out into wide-extended plains. The filling up of these valleys, consisting of the material brought down from the adjacent mountains, is so loose and porous that the snow when it melts is absorbed by the soil, or, sinking to bedrock, flows out into the center of the valley, but little ever coming quite to the surface. In the winter, shallow lakes are often formed at the points of greatest depression in these valleys, but they disappear in most instances as the dry season

advances. By reason of these conditions water can be obtained in these valleys and plains almost everywhere by artesian boring, and that generally at no great depth. Hence, while there is not much water on or quite near the surface in this region, and most of the mountain streams dry up early in the summer, it will, by recourses to deep-well digging and boring, be possible to obtain here water enough for a large amount of stock, as well as for extensive irrigation. This, while it will in large measure insure the prosperity of the farming and cattle interest, will also serve to largely promote mining, a great deal of the ore being carried from the mines down into the valleys for reduction. More than half of the ore extracted from the Utah mines is treated at the several large smelters located in this valley of the Jordan.

Thus it will come to pass that all the leading industries of this immense basin will be rapidly advanced notwithstanding its scanty rainfall. For the output of the mines an annual increment of ten million dollars for some years to come may be safely counted upon. That a similar growth in the other forms of wealth, as well as in population, will follow, may also be set down as likely to ensue. Meantime the term "Great American Desert" having been eliminated from the maps, will cease to have "a local habitation and a name."

Foundry Notes.

The new North Star mill, Nevada county, built by the Risdon Iron Works, will be started up shortly, and, it is said, will be one of the most complete gold mills in the State. The whole mill is to be run by water-power. This water is first used by the Empire mine, and is carried from there by 10,000 feet of iron pipe. The Risdon Works have also been putting up some machinery in a mine at Angels, Calaveras county.

The Union Iron Works are still engaged in the temporary erection of the great iron dome for the Lick Observatory. Mr. Irving M. Scott has returned from the East and will vigorously prosecute the work on the cruiser Charleston. These works hid lowest on Cruiser No. 1; also on No. 2, but the first was withdrawn. The telegraph this week announces that the contract on Cruiser No. 1 will be re-advertised. The Union Works may get this after all. On another page we give Mr. Scott's speech to the workmen who welcomed him home. Our space last week having been fully occupied by our annual mining review, we were compelled to leave the account over until this issue.

The Pacific Iron Works have just completed shipment of a 10-stamp silver mill for the Mt. Diablo Company, of Esmeralda county, Nevada, embracing chloridizing furnace, pans, settlers, etc. They have also in hand a 20-stamp mill for the La Luz Mining Co., of Guanajuato, Mexico. This mill will be furnished with three 75-horse power Hazelton hoilers, which these works are introducing so successfully on this coast. Also a 50-ton chloridizing furnace for the Manhattan Company, of Austin, Nevada; water-pipes, gates, etc., for the Walnut Grove Water Company, of Arizona; tramway for the Standard Mining Co., of New Mexico. They are sending several Duncan concentrators to various parts of the country, including two shipments to South America.

Silver Coinage.

As far as the miners of this coast are concerned, the silver question is the most important matter that Congress has to deal with. Unfortunately it has got into "politics" more or less, and there are now so many branches of the subject that there are very few who understand it. The most recent action concerning the question in Congress is the answer of the Director of the Mint to the House resolution relating to silver coinage, which was this week transmitted to the Speaker by the Secretary of the Treasury. The director presents a table from which it appears that the cost of the amount of bullion delivered on monthly purchases during the past fiscal year was \$24,398,002, and the face value of the coinage was \$29,838,905. During the first six months of the current fiscal year, the cost of monthly purchases of bullion was \$13,548,403, and the coinage was \$15,960,361. In only one month (July 1885) did the coinage fall below \$2,000,000. In

that month the total cost of purchases delivered was \$1,578,874, from which the coinage was \$1,900,000. The director says that it will be seen from this table that the law has been complied with during the past fiscal year as well as for the remaining months of the calendar year of 1886.

Carboniferous Fields.

Coal on the Pacific Slope.

Since Americans have been living in California, more or less interest has been felt in the discovery of coal in this State; prospectors have wandered far and wide, but as yet little success has rewarded their search. On the western slopes of the Sierra Nevada, occasional deposits of brown inferior lignite have been found, notably at Ions, and carboniferous traces have been discovered here and there in the Coast Range. One important seam, and one only, has been mined to any extent, and that at Mount Diablo; but this deposit is poor in quality, when compared with the coals of Pennsylvania. Indeed, the statement of geologists would seem to have weight that California was upheaved from the ocean at a later period than the great carboniferous age, and that its strata are of too recent origin to be coal-bearing. If these scientists are right, there is little or no hope of finding coal here.

The Pacific Coast, however, geologically increases in age toward the north, and valuable discoveries have been made in Washington Territory and above. The history of these discoveries is given by Mr. H. H. Bancroft in his volume on British Columbia. In 1835, a party of Quakwolds Indians, from the north end of Vancouver island, came for the purpose of trade to Fort McLoughlin, a station of the Hudson's Bay Company. Full of curiosity, they wandered, one day, into the blacksmith shop, where they watched the smith draw his glowing iron from the fire and shape it, with sturdy blows, on the anvil. Presently they saw him replenish his fire with a black, lustrous, rock-like substance; and as they saw with astonishment that it glowed and burned, they crowded eagerly around the furnace. They turned to the pile on the ground, picked up the lumps, turned them round and round, broke them, hit them, and finally threw them down with a questioning grunt. "What is that?" they demanded. "Stuff to make the fire burn," replied the smith, good-naturedly. "What do you call it?" "Coal." "How is it made?" "It is dug out of the ground," and the smith told them that the coal was brought in vessels from England, a country a long way off.

Drawing off into a clump as the show-ers of sparks began to fly from the anvil, the Indians fell to talking and gesticulating among themselves. They finally seemed to come to an understanding, and then burst into wild laughter. Turning to the coal again, they examined it thoroughly, and finally told the smith that though the white man was wise in many things they were fools to bring from a great distance a substance that could be found at their doors, and that in their country the same substance could be found in many places.

Word was sent to Fort Vancouver, and in due time McLoughlin, the chief trader, ordered the company's steamer Beaver to stop at the place indicated by the Quakwolds and ascertain the truth in regard to their report. The vessel stopped, and the crew went ashore to make the search. By distributing a few presents among the natives they soon learned where the deposits were. Indeed the coal beds were visible from the beach, where for about a mile the waves had washed away the soil and left the seams exposed. At another place a rivulet had cut its bed through the strata for three-quarters of a mile back from the shore. The coal was found to lie in extensive fields and in clumpy mounds.

A few men were employed by the Hudson's Bay Company in developing this deposit, but through lack of proper implements progress was slow. The surface coal was of inferior quality, suitable for steam purposes, but useless for the blacksmith; the substrata, however, was of better quality. The works were extended, and improvements were made, till, in 1849, a force of 40 men—whites, half-breeds and Kanakas—were landed, and a regular post, Fort Rupert, with storehouses, workshops, and officers' quarters, was established there. Thorough investigation,

however, showed that the coal seams there were not profitable to work.

The coal deposits at Nanaimo were also discovered by the aid of an Indian. He, too, noticed coal in use by the blacksmith at Fort Victoria, where he was having his gun repaired, one winter's day in 1849. This old Nanaimo chief said that he knew of beds in his own country, and was told that he could have his gun repaired without charge and a bottle of rum also if he would bring in some specimens. The old chief departed, and nothing more was heard of him for some months. He was old and feeble, and during the long winter he lay sick, almost at death's door. With returning spring, however, his strength revived, and the old man began his work, determined to earn his bottle of rum. One day, early in April, he paddled into Victoria harbor with his canoe loaded with coal. It was taken at once to the forge, examined, and tested by the smith, and was pronounced to be of excellent quality. The savage received his well-earned rum.

A prospecting party was fitted out at once by Joseph W. McKay, and they landed near where the town of Nanaimo now stands, about May 1, 1850. They carefully examined the country for miles around, and on the 8th of May McKay located the Douglas vein, which is still being worked. At Commercial inlet was a seam, three and a half feet thick; but the average thickness proved to be about double this.

On the northwestern extremity of Nanaimo harbor a shaft was sunk by experienced miners, and a thickness of six or seven feet of coal was found. In 1852 work began in earnest here; the fur company erected the necessary buildings and established Fort Nanaimo, and the development of the mines was commenced with great vigor. The first cargo of coal sent to San Francisco was by the ship William, and it brought there \$28 a ton. Work has been carried on continuously in these fields up to the present time, and through this industry Nanaimo has developed into a busy, incorporated town. The area of the coal fields here has been estimated to be 90 square miles.

In 1852 or 1853 coal was discovered at Bel-lingham bay by two woodchoppers, who found coal in a mass of earth, clinging to the upturned roots of a fallen tree. They examined the ground beneath and found a seam several feet thick; a claim was entered, which afterward was sold for \$10,000 at San Francisco. Several companies were organized to work this and adjoining claims, of which the most prominent were the Puget Sound Mining Company and the Mamoose Mine Company.

Anthracite coal has been discovered in the Queen Charlotte islands, and the seams have been found to be of considerable extent and value. A company, taking its name from these islands, established extensive houses, tramways, inclines and a wharf at Cowgitz, to mine this coal. Anthracite has also been found at Cumshewa harbor, and at Masset, in the northern end of the islands.

Coal has been discovered on Baynes sound, and in the vicinity, which is pronounced superior to that of Nanaimo, but the harbor facilities are much inferior. Five thousand acres of coal lands are owned by the Baynes Sound Colliery Company, Limited, which began operations ten miles southeast of Comox, in 1876. By the end of the following year a narrow-gauge tramway, running from the mine $3\frac{1}{2}$ miles, to tide-water, had been constructed, and a locomotive and cars procured. A wharf, with two chutes, was built, and a town was laid out, named Quadra.

By the act of the Legislative Assembly April 18, 1877, the coal mines of British Columbia were placed under stringent and healthful regulations. By this act women and girls are not allowed to work in the mines underground, nor boys under 12. If, on account of the thinness of a seam or from any other cause a boy under 14 is employed, he shall not work more than five days, of six hours each, in any one week. Wages must not be paid in a liquor saloon, and if payment is made on the amount of coal raised the check-weigher may be nominated by the miners. Examiners are appointed to examine and grant certificates of competency to managers, who are required to be experienced and temperate men.

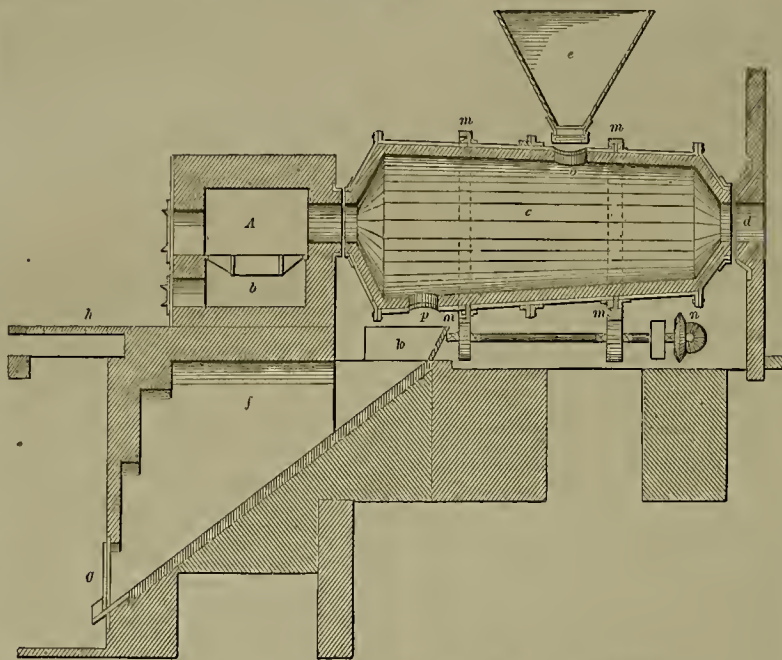
The Mining Bureau.

The original bill introduced in the California Legislature appropriated \$125,000 to the support of the State Mining Bureau. The majority of the Committee on Mines and Mining agreed to report it for \$60,000, but the minority agree only to \$20,000, on the plea that "the purposes of the bill will not prove beneficial to the mining interest, and instead of stimulating mining will only deplete the treasury." The last Legislature appropriated \$20,000, and of this there is a balance of \$2500, as also an unexpended balance of \$2400 in the Mining Bureau fund, making in round figures \$5000 to the credit of the trustees. The minority believe that "no such sum as asked for is needed, nor that the Bureau is of any material value to the development of mining interests."

It is difficult to say exactly what the Legislatures of late years think will prove beneficial to the mining interest. This interest has had to take care of itself as best it could for some time. The only thing now asked is the support of this Bureau. The minority report referred to above says: "It is idle to hope for much results from asserting and displaying rocks in the richly furnished parlors of the Mining Bureau." But if the trustees and mineralogist have no money for anything else they must confine themselves to the mere task of collecting

tion referred to, rather than collecting minerals. However, it was determined by the official appointed that a collection of minerals was the most important, and the Bureau became more prominent in that direction than others. This was considered a mistake by many friends of the Bureau who urged the collection of data concerning the working of mines, pumping, hoisting, treating ores, etc.

It is now seen that this information is needed and desired, and must be obtained if the Bureau is to be a permanency. Meantime, however, the ore and mineral collection has grown to be large and of great value, and its care is expensive, by reason of the space required to display it. It fills a sphere of usefulness in that it conveys to strangers and visitors an idea of the magnitude of our mineral resources. But a small appropriation will only maintain this feature. It will not permit the Trustees and State Mineralogist to carry out the plans they have formulated. They realize fully that the data needed will not be forwarded to them. They must send out competent men to collate the facts, and then publish. There is now no official source of information concerning these matters. Each miner or millman goes on in a haphazard way, without any means of finding out what others have done in the same direction. With data which would be collected in a year or two, this would not be the case.



ARENTS' IMPROVED ROTARY ROASTING FURNACE.

minerals. It may be confessed that too much attention has been given to this branch and too much money spent on it in the past, and it may be confessed also that collecting minerals is not the very best way to advance the mining industry. This is realized by the present incumbent in the office of State Mineralogist, and it is with the idea of extending work to the field that the increased appropriation is asked.

The writer conversed with the trustees and mineralogist on this subject some months since. There is an evident desire on their part to make the Bureau of more practical service to the mining industry than has been the case before. They want to send suitable men to the various gold mills in the State and collect data concerning the best practices. They want to find out the best weight and drop of stamps, best systems of amalgamation and saving fine gold, plans of utilizing and applying water-power, etc. It is desired to gather all this data and publish it for the benefit of the mining community.

There is no doubt that all this should have been done by this institution long since. The MINING AND SCIENTIFIC PRESS advocated this in the early days of the Bureau. The late Joseph Wassen, who originated the bill creating this State institution, was in favor of this plan also. In fact, he never intended it to be a mere collection of ores and minerals, well enough in their way for purposes of study and comparison by students, but of little use for advancing mining development or the mining industry. When George C. Perkins, as Governor, signed the bill, he also, as a miner owner, was in favor of the Bureau collecting the informa-

tion referred to, rather than collecting minerals. However, it was determined by the official appointed that a collection of minerals was the most important, and the Bureau became more prominent in that direction than others. This was considered a mistake by many friends of the Bureau who urged the collection of data concerning the working of mines, pumping, hoisting, treating ores, etc.

Reduction Works.

The Rano reduction works, which we described fully not long since, have been in full working order some weeks and a few days since made their first shipment of hullion. A smelter is being erected and will be in operation in about two weeks. The ore is said to be coming in as fast as two such works could use it.

Works of this character are just what are needed at central points in other States and Territories. There are many small districts and camps where there are ore-producing mines, but where there are no means of beneficiating the ores. Moreover, the presence of reduction works in any vicinity stimulates prospecting and mining. When the miners know to a certainty that they can dispose of their ores, or can have them worked, they are encouraged to go on with prospecting or development. There are many towns where the merchants and business men themselves could afford to put up works for treating ore. Such things attract a mining population and enliven the whole neighbor-

hood. The success of the Rano reduction works was assured from the beginning, as there was plenty of ore promised to begin with. It is hoped the example set there will be more generally followed elsewhere.

New Rotary Roasting Furnace.

It is a well-known fact that the intensity of the temperature of heated gases, coming from a fireplace and passing through any space of more or less extent, diminishes gradually as the gases pass on, the intensity of temperature being greatest nearest the fireplace or entrance and smallest near the flue or exit. It is also a fact that in ordinary roasting furnaces the layer of ore in the roasting chamber is of equal depth from one end to the other, practically speaking; hence with a flame of varying temperature, as it passes through the roasting chamber, the ore is usually overheated at one end, near the fireplace, while it remains "underdone" or insufficiently heated and roasted at the other end near the flue.

Mr. Albert Arents, of Alameda, has devised certain improvements which obviate this drawback entirely, or at least to a great extent, for by it he secures a layer of ore through the length of the roasting chamber or "hearth" of graduating thickness or depth, in conformity with the varying or graduating intensity of temperature of the gases passing through it—that is to say, where the greatest heat is, the layer of ore is deepest, and vice versa.

He makes the diameter of the roasting chamber or cylinder, gradually decreasing from the end nearest the flue. When such a furnace or roasting chamber is charged with pulp or crushed ore, and the chamber is rotated around its horizontal axis, the material seeks a level and its surface soon lies parallel with the horizontal axis of the chamber; hence it is necessarily thickest or deepest toward the greatest diameter of the chamber, graduating the thickness or depth toward the smallest diameter of the opposite end, at or near which the layer of material is thinnest or most shallow. If, now, the chamber is continued to rotate, the pulp changes its surface, continually falling or tumbling sideways, keeping its place in reference to the length of the chamber; and if a flame is passed through this chamber from the widest toward the smallest end, said flame finds more pulp to heat where itself it is hottest, and correspondingly less where it is coolest.

In the accompanying engraving *A* is the fireplace; *b* its ash-pit; *c* is the roasting chamber, in the form of the frustum of a cone; *d* is the flue through which the products of combustion escape into any suitable series of dust chambers and chimney; *e* is a sheet-iron hopper, receiving the charge of ore, prior to its introduction into the roasting chamber; *f* is a bin of masonry, located underneath the fireplace, and receiving the roasted ore when discharging of the chamber takes place; *g* is a sliding-door of cast iron, through which the ore is removed to the cooling-floor; *i*, after it has remained in the bin for several hours, and has gone through what is termed "banking;" *h* is the fireman's floor; *k* is the sheet-iron extension of the bin, *f*, in the form of a removable funnel; *l* are friction rollers upon which the chamber is mounted and revolved; *m* are cast-iron rings, tires or bands of equal exterior, but unequal interior diameter, fastened to the roasting chamber and receiving their motion through friction on the driven rollers; *n* is the gearing, transmitting power to the rollers; *o* and *p* are openings, serving respectively for charging and discharging the ore, which are closed at proper times by cast-iron hinged goods, usually applied for charging and discharging this class of furnaces.

The difference between the largest and smallest diameter of the roasting chamber proper is from 12 to 18 inches, according to the length of flame any local fuel may give. The larger the flame, the less difference should be in the two diameters; the shorter the said flame, the greater should be this difference. The roasting chamber consists of a heavy sheet-iron shell, and is lined with four inches of common fire-brick or any suitable lining. Rollers and support rings are made of chilled cast iron.

THE Milton Mining and Water Company has been adjudged in contempt for ground-slucing and hedrock cleaning, by which certain materials described in the decree of injunction have been discharged into the river from the mine at French Corral.

THE new 40 stamp mill of the Granite Mount ain mine, Phillipsburg, Montana, has been started up.

MECHANICAL PROGRESS.

Welding by Electricity.

Prof. Thomson recently lectured before the Society of Arts connected with the Boston Institute of Technology, on this new discovery in electricity. He alluded to its wonderful expansion in the field of usefulness during the last 15 years. Heating by electricity is now practicable when the supply of heat waste is small, or when simply quick heating, or very high heating for a short time, is necessary. Upon this depends its use in welding. Up to the present the process of welding has been confined within narrow limits, the metals upon which it could be practiced being few. By the new method, a broken bar of metal can be easily reunited, or bars of different metals welded together; and those metals which previously resisted welding most strenuously are now joined with ease, while those previously easily welded remain the same by the new process. Differences in specific electrical and heat conductivity are the properties which are most troublesome. The method consists in simply forcing the ends to be welded together tightly and passing a sufficiently powerful current of electricity through the joint. The resistance raises the metal to a welding heat, and the pressure makes the joint.

The speaker next enumerated some of the practical results obtained personally within a recent period. Iron and copper wires of varying dimensions have been joined end to end. Steel or iron bars nearly an inch in diameter have been solidly welded together, and steel has also been joined to brass. A copper rod nearly one-half an inch in diameter has been welded, requiring a current of 20,000 amperes. Specimens were shown of the results of the above-mentioned weldings, and of many others recently made. Steel-pointed tools may be cheaply made of inferior metal, and new points welded on as desired.

The cost of the new process is undoubtedly less than by the old method of forge and hammer, while the time required is very short, and no heat is wasted. After explaining clearly the meaning of the terms volt and ampere, Prof. Thomson stated that in welding a steel bar $1\frac{1}{2}$ inches in diameter, a current of 6000 amperes in volume, and having an electro-motive force of one-half a volt, was necessary. The use of 35-horse power for one minute is another way to state it.

The chief essentials of the apparatus are the means of getting a heavy current through the metal without loss. Carefully adjusted clamps hold the pieces to be welded in a true position, end to end, and by means of a cam their distance apart can be brought to a minimum. A secondary battery, or, preferably, an inductive coil, is used to obtain the enormous current. The shortest possible connection is made to the clamps, which are of brass and solidly constructed. The pieces to be welded are polished bright and placed in the clamps, touching end to end. The current passing through renders the metal molten, and springs in the clamps keep the contact forcible. The weld is probably simply the result of heat and pressure, and electricity plays no part beyond the heating. Should the heating be unequal on the section, by a simple law the rise of temperature becomes uniform, as cold metal is a better conductor, and more electricity thus passing raises to the average temperature of the colder part. All the apparatus was exhibited in working order, and many successful welds were made in a remarkably short time and the results critically tested. The apparatus and methods are fully covered by patents and can, of course, be used only by permission of the inventor, Prof. Thomson.

PISTON PACKING.—Relative to the discussion of the question, "What is the best form of packing for piston heads and stuffing-boxes?" which was presented at a recent meeting of the Western Railway Club, it may not be amiss to direct some attention to this average character of piston and valve rods and spindles. As a matter of fact, it is not unusual to find such rods, even when new, in a remarkably poor condition. Not only are they often turned out of the shops indifferently finished, but in the subsequent work of fitting and erecting they are handled in a manner which would leave little to remain of the most carefully turned and highly polished surface. It can scarcely be said that any care is taken of these rods when an engine is being put together, and whatever work may have been expended on them to furnish them in the best possible condition is frequently wholly wasted. It is not surprising, under the circumstances, that in the end stuffing-boxes and packings of every description fail to keep them tight, and that they prove to be sources of constant expense and troublesome delays. The idea which unfortunately prevails to some extent, that a valve or piston-rod will and should work itself smooth in a stuffing-box, is responsible for a good deal of this carelessness and should be vigorously dispelled.

A PENDULUM CHURN.—The latest novelty in churns is one which works on the principle of the pendulum. The churn is hung up and by devices of counterbalance weights and springs is moved back and forth like the weight on a clock pendulum, by the exercise of a very little force. The construction is very simple; there is no iron or metal of any kind to be brought into contact with the cream, thereby avoiding

any collection of corrosive matter; it can be readily taken apart for cleansing and cannot get out of repair. The evenness with which it brings the butter gives, it is claimed, a larger percentage from the same amount of cream than other churns. A small as well as a large amount can be churned and the churn is made of different sizes. A small child can operate a large churn.

Malleable Iron Ore.

McRae, in his "Products and Resources of Arkansas," says that altogether the most remarkable and interesting mineral of all that region is the white, malleable iron ore, regarding the existence and malleability of which a great deal of skepticism is said to exist. It is found in the corner of Howard county, adjoining the frontier of Montgomery, Polk and Pike. During the war, it is stated on good authority, the inhabitants of the vicinity used to take the ore as it was picked up from the ground, and, in an ordinary blacksmith forge, hammer it into horseshoe nails. Whether this is true or not, it is certain, and can be abundantly proved, that the ore can be taken and, being heated in an ordinary blacksmith forge, can be welded and beaten into any desired shape. It should be remembered that this white iron ore has been analyzed more than once. Mr. Charles E. Wait, of the Missouri School of Mines, makes the following quantitative analysis:

Water.....	9.94
Silica.....	16.27
Ferric oxide.....	69.69
Ferrous oxide.....	1.03
Alumina.....	2.55
Sulphur.....	.03
Phosphoric acid.....	trace.
Total.....	99.51

The outcrop of this ore, as far as it has been explored, runs for two miles west to east, showing a width of from 15 to 30 feet, with an unknown depth. There can be no doubt that this development of iron, in so pure and malleable a form, will some day be immensely valuable. The magic touch of a railroad will convert it into gold.

BENDING IRON OR STEEL PLATES.—An invention of Mr. Joseph Toward Eltringham, of South Shields, England, relates especially to the bending of the shell plates of marine boilers of great thickness—required for high working pressure—without the use of rolls, dispensing with the heating of the plate, which frequently injures the quality of the material, and insuring that the plate shall be bent to a true radius over its entire surface, which is not effected by roll bending. The operation of bending, according to this invention, is effected by concave and convex molds of the required radius, each application of which bends a portion of the plate equal circumferentially to the breadth of the molds and axially or longitudinally to their length, which will be sufficient to take in the largest plates required to be dealt with. The machine may be arranged to operate either vertically or horizontally, as may best suit special conditions, but in either case it is perfectly self-contained, requiring no further foundation or steadiment than is necessary to support its own weight and that of the plate being bent. The plate may be moved forward as each section is completed upon rollers and the use of the crane dispensed with except to bring it to the machine in the first instance, and to remove it when completed. The machine may be adapted for corrugating—simultaneously with the bending or not—plates forming any arc of a circle by using corrugated molds, the operation being the same, and the plate may be heated or not as may be required.

THE BOILER INSPECTOR BILL.—The Senate committee has been discussing Senator McCarthy's bill, which provides for the appointment of steam boiler inspectors. By its passage six boiler inspectors would be appointed—one for each congressional district. A large number of persons were present. President McEvoy, of the Pacific Boilermakers' Association, was the principal witness. Messrs. Baker & Hamilton also visited the town on that account. The San Francisco representatives are willing for the bill to pass, but there is a strong opposition to it among the country members. They hold that in the interior the boiler inspector would have every farmer who has an engine at his mercy, and the place would engender blackmail. Farmers with immediate need for harvesting would have to sue for mercy at the hands of one man.

TO MAKE A FLANGE JOINT THAT WON'T LEAK.—To make a flange joint that won't leak nor burn out, on steam-pipes, mix two parts of white lead to one part red lead, to a stiff putty; spread on one flange evenly, and cut a liner of gauze wire—like mosquito-net wire—and lay on to the putty, of course cutting out the proper holes; then bring the flanges "fair," put in the bolts and turn the nuts on evenly. For a permanent joint this is A 1.

LOSS OF HEAT IN GAS-ENGINE.—Experiment has shown that when an explosive mixture is burnt in a cylinder of a gas-engine, very nearly half the total heat developed by the gas is lost by coming in contact with the wall of the cylinder.

AN ODORLESS SOLDER.—A soldering fluid composed of a teaspoonful of chloride of zinc dissolved in two ounces of alcohol will not rust and tarnish and has no bad smell.

SCIENTIFIC PROGRESS.

The Conservation of Force.

The subject taken by Mr. R. Howson, the president of the Cleveland Institution of Engineers, for his inaugural address, at the meeting of the Institution on Nov. 22d, was "The Conservation of Force and Some of its Possibilities." The author explained that all the natural powers which were employed depended upon the development of potent or static energy into the energy of motion. When that motion had been utilized, this energy was lost, and could not be recovered except by a renewal of its source. The principle was traced in the case of falling water, the steam engine, in voltaic electricity, and in the dynamics of animal life, and it was shown that in every instance the force developed and used up represented so much waste of original power, which waste would have to be made good, otherwise the system would come to an end. The balance was invariable, so far as could be ascertained in our laboratories and workshops.

Nevertheless, it was contended that outside our terrestrial sphere, the conditions were different, and therefore the results would be different. In one case it was pointed out that we actually know this to be true, viz., that the principle of gravitation, which brings everything to a standstill here, is, in the planetary system, one of the components of two forces which are the cause of unceasing orbital motion.

After referring to permanent magnetism as in some respects falling into the same category as magnetism, the president entered into some speculations as to other cosmic possibilities which might be true, although, owing to our environment, these possibilities could not be realized here. Among those was the question of the radiation of the sun, whether that was really in process of decay or not. The doctrine of the dissipation of energy leads to the appalling result that the universe must ultimately come to one dead level of coldness, darkness, and desolation. The author contended that this doctrine might not after all be true, but that there was a law of compensation coexistent with the process of radiation.

SEOREATING LIGHTNING FROM HEAT.—When anything becomes heated, says an exchange, it has received with the caloric a portion of electricity, and if, by any means, the caloric can be abstracted, the electricity should remain. Take a bell-glass and heat anything, such as sand, flour, meal, iron filings, copper filings—in fact, any substance in the form of a powder, and dust it into this glass on any cold morning when the thermometer is in the vicinity of zero, and the glass will at once become strongly electrified. To get the best results, the cold should be so intense as to immediately abstract the caloric, which passes through the glass into space without warming the glass, in this respect resembling sun-heat. The glass, however, being a non-conductor, the electricity remains imprisoned. Air, when heated, also requires a large supply of electricity, even more than aqueous vapor. Hence air becomes highly charged with electricity occasionally when no vapor is present. For experiment, take a pig's bladder and partly fill it with dry air. Heat this until it expands. Carry the bladder out of doors and pass the hot air in it into another bladder, through a rubber tube, and the air, when it enters the cold bladder, becomes electrified. Next hold the mouth of this bell-glass downward and press the hot air out of the bladder into it, and the bell-glass will become electrified. There are hundreds of other ways by which one can prove that when a thing is heated it also receives electricity. To perform the above experiments successfully, the cold employed should be below the freezing point, at least, and as much lower as convenient.

INSTANTANEOUS PHOTOGRAPHY.—Mr. Mallin, a photographic artist, of Southport, England, has recently been very successful in taking instantaneous photographs of flying gulls. Animals in far more rapid movement have been photographed by Mr. Muybridge in America, or M. Marey in France; but these are produced by special apparatus, and rarely give much more than a silhouette of the object photographed. The photographs of the gulls were taken by Mr. Mallin under ordinary conditions, and with ordinary apparatus; but the lens must have been a good one, and a very rapid shutter must have been employed. The plate also must have been of special high sensitiveness. About 60 birds are shown quite sharply and distinctly, and their various attitudes are curious. Most of them have the wings spread in the orthodox manner, but some of them are caught in the position with the wings hanging down, which, from the shortness of the time during which it is maintained, the eye does not appear to catch. The photographs are striking examples of the speed with which objects can now be thus reproduced.

PRODUCTION OF CITRIC ACID.—Chemists have lately been much interested in the discovery that large quantities of citric acid may be extracted from the fruit of the cranberry, which, it appears, contains one and a half to one and three-fourths per cent of pure acid, and accompanied by one-fourth to one-third per cent of malic acid; but the quantity of the latter is found to vary in different localities, and it di-

minishes as the fruit becomes perfectly ripe. In this process the fruit is ground in a mill and pressed to obtain the juice, the residue being treated with water, subject to pressure three times more; the first operation yields 57 per cent of free acid. The liquids being all united, are treated with a solution of gelatine, which precipitates all the tannin; the precipitate is very abundant, but is soon deposited. Having ascertained by a test made upon a small portion of the clear liquid how much carbonates of lime is required to saturate it, this quantity is added to the whole of the solution decanted, not filtered, from this precipitate of tannate of gelatine; when the entire liquid is perfectly saturated it is heated until it boils; the boiling causes citrate of lime as white as snow to be deposited, and this being collected and strained in the usual manner, is decomposed by the action of sulphuric acid at 10 per cent. From one to one and a fourth per cent of pure crystallized citric acid can thus be obtained from the fruit of the cranberry.

MEASURING THOUGHT ACTION.—Starting with the idea that the hand varies considerably in size with the quantity of blood present in it at any moment, Prof. Morse, the Italian physiologist, has made some most interesting investigations. In his first experiments the hand was placed in a closed vessel of water, when the changes in the circulation produced by the slightest action of body or brain, the smallest thought or movement, was shown by a rise or fall in the liquid in the narrow neck of the vessel. With a large balance on which the horizontal human body may be poised, he has found that one's thoughts may be literally weighed, and that even dreams, or the effect of a slight sound during slumber, turn the blood to the brain sufficiently to cause the balance to fall at the head. When the brain of the person balanced is being relaxed from thought, the flow is toward the feet, with a corresponding oscillation. The investigator has continued his studies of the circulation until it seems that he may almost read one's thoughts and sensations. A single pulse-beat shows him whether a person is fasting or not; two beats serve to determine whether the subject is a thinking or a heedless one, whether asleep or awake, cold or warm, agitated or calm. The changing pulse even told him when a professional friend was reading Italian and when Greek, the greater effort for the latter having due effect on the blood flow.

CHEMICAL REACTION FROM PRESSURE.—It has lately been shown by experiment, that, by the simple action of pressure upon two solids, previously thoroughly intermingled in a pulverulent condition, a chemical reaction between the two is effected. The substances experimented upon were barium sulphate and sodium carbonate, about one gram of a mixture of these two substances being submitted to compression; the cylinder resulting being then pulverized and submitted to the action of water, and the insoluble residue analyzed to determine the amount of barium carbonate produced. It was found that by compression of the mixture, under a pressure of 6000 atmospheres for a few seconds only, nearly one per cent of the barium sulphate had been transformed into carbonate; and upon subjecting the material of the first cylinder anew to compression, four times in succession, the amount of the carbonate produced rose to 4.78 per cent and after six to 8.99 per cent. It is also ascertained that if these cylinders are left to themselves after compression, the chemical action will continue for a period of some 14 days, the quantity of barium carbonate produced in the cylinder submitted to six compressions rising during that time to 10.89 per cent.

IMPROVEMENT IN ENGINE PISTONS.—This invention consists in making the piston body with a suitable number of holes round its external surface, in which are placed a corresponding number of inverted spiral steel springs; within each spring is fitted a metal stud, having a tapered head, to open or expand the outside ring of the piston, so as to get the same steam tight all round the piston. The piston rings are correspondingly shaped to receive the tapered head of the studs, and the other end of the stud is placed and works in a recess made in the body, extending toward the center of the piston. Patents claim the construction of the piston as set forth, whereby a direct equal pressure is obtained both at the top and round its sides, in effect rendering it a double compensating piston, perfectly steam tight, and expanding both in diameter and horizontally.

HOW THIRSTY PLANTS GET WATER.—In the arid regions of Egypt a French botanist, M. Volken, has found roots 20 times as long as the part of the plant above the surface. On some of these desert plants the same observer has noticed a very curious moisture-absorbing contrivance. Glandular hairs put forth by the leaves yield a bitter crystalline liquid which spreads out at night and collects the dew.

ASTRONOMY IN ANCIENT CHINA.—One of the best evidences of the early study of astronomy by the Chinese is found in one of the Paris libraries. It consists of a Chinese chart of the heavens, made about 600 B. C. In this chart 1460 stars are correctly inserted, as corroborated by the observations of modern astronomers.

BURMESE SLATES.—A peculiar black pepper, made from the bark of certain trees, serves the purpose of slates in Siam and Burmah, the writing being erased by means of betel leaves.

ENGINEERING NOTES.

The Efficiency of Electric Motors.

A number of experiments, says *Engineering*, of London, have been made by Mr. W. M. Morley and Mr. C. Watson, at the factory of the Anglo-American Brush Electric Light Corporation, to find out the best principles on which to construct electric motors and the reason why the dynamo as a motor should have a lower efficiency than when working as a generator. As given in the *Philosophical Magazine*, these principles are: 1. That the magnetic field should be a very strong, and the armature a very weak, electro-magnet. 2. In both generators and motors, lead, distortion or displacement of the brushes or the magnetic field is wrong, and is to be avoided by attention to the first condition. If there be any lead in dynamos, it is in the direction of rotation; in motors it is in the opposite direction, as the course of the current through the armature is reversed, but the field is the same. 3. In both generators and motors absence of sparking at the brushes depends mainly on the first condition being complied with. 4. Reversal of rotation. In neither generators nor motors is movement of the brushes necessary.

It appeared from these principles of construction, which are applicable to both generators and motors, that the lower efficiency of the dynamo as a motor must be due either to friction at the bearings, air friction and friction of the brushes against the commutator; to loss of energy in heating the armature and field magnets and to self-induction; or to loss by the production of eddy currents in the iron. From the nature of these probable causes consideration shows that the last is the true one; for in a dynamo the rotation of the armature causes eddy currents to be generated in the iron core in the same direction as the conductor proper with which the core is surrounded. Of course as the armature is always more or less subdivided or laminated in a direction at right angles to the lines of force, any circulation of currents round the core is avoided; but local currents or "eddies" are set up, and taken as a whole these eddy currents on the outside of the core are in the same direction as the current flowing in the copper conductor. In an electric motor, however, the eddy currents and the currents in the copper conductor are in opposite directions, as, although the electro-motive force set up in the conductor is in the same direction in a motor as in a dynamo, the current in the former is forced through the armature in a direction contrary to the electro-motive force. It will be seen that while in a dynamo the two sets of currents, those in the iron and those in the conductor, tend to oppose and to reduce one another, in a motor they act in such a manner as to mutually assist one another. Thus, with the strength of field, the current in the conductor and the speed the same in both cases, the eddy currents in the iron core of the armature will be greater than in a generator, and the loss from heat more.

A TEN-INCH DRAUGHT STEAMBOAT.—A steamboat has been built to navigate the Allegheny river between Pittsburg and Kittanning, a distance of 45 miles. Although 142 feet long and 25 feet beam, she draws but 10 inches of water. It has been nearly or quite 20 years since steamboat packets ran on the Allegheny, and it has been believed that the railroads had crowded them off for all time; but the builder of the craft mentioned believes that there is still a chance for a line of properly constructed boats, and, if this first venture pays, we believe he intends to add other boats, and perhaps run some of them as far up as Oil City. There must be many streams navigable for steamers of light draught like the above.

THE EADS SHIP RAILWAY.—Captain Eads has kept so quiet lately concerning his project of building a ship railway across the isthmus of Tehuantepec that some people might suppose he had abandoned it. Not so. He had little confidence, however, of obtaining any assistance from Congress further than securing a charter for the road, which being done, he thinks there will be no difficulty in obtaining money to construct it from great capitalists of this country and Europe.

THE HARLEM SHIP CANAL.—Charles Stoughton, of New York, who will ask Congress for \$1,500,000 to complete the Harlem ship canal, urges upon citizens of Chicago that that city is notably interested in the New York project, because when it is completed dressed meats from that point can be deposited in London in seven and a half to eight days by the new route. The cost of the improvement is estimated at \$2,500,000.

THE MARKET-STREET CABLE ROAD, in this city, is probably the best-paying property of the kind in the country. The road is said to pay six per cent interest on \$6,000,000, an amount more than double what the road cost.

THE MEXICAN GOVERNMENT is building a railroad similar to the Panama railroad across the Isthmus of Tehuantepec. It is broad gauge. There are no tunnels in it, as it goes through a pass in the mountain chain.

CABLE ROAD FOR SAN JOSE.—Arrangements are being made for the construction of a cable road between San Jose and Santa Clara. The estimated cost is \$170,000.

USEFUL INFORMATION.

ADULTERATED CAMPHOR.—Crude camphor is adulterated with common salt, sulphur, vegetable matter, tar, and water. Its purification can be best accomplished by sublimation in glass flasks of a capacity of eight pounds to ten pounds, at a temperature of 400 degrees Fah. These flasks are made of thin glass, with flat bottoms and short necks. They are put into a sand bath, where a uniform and rapid heat can be applied. The crude camphor is broken up, mixed with three to five per cent freshly slaked lime and one to two per cent iron filings, well sifted and introduced through a funnel into the neck of the flasks. The flasks are then put into the sand bath, covered with sand to the neck, and heated gently for half an hour to expel the water. As the temperature increases the camphor softens, and finally melts. After the whole mass has become fluid the sand is removed from the upper part of the flask and a paper stopper put in to close it partially. The heat is then carefully preserved at a point sufficient to sublime the camphor, but not to remelt it. In this way a very pure article can be obtained.

CIGARS AND MEN.—If a man smokes his cigar only enough to keep it lighted, and relishes taking it from his mouth to cast a look at the curl of smoke in the air, set him down as an easy-going man. Beware of the man who never releases his grip on his cigar and is indifferent whether it burns or not. He is cool, calculating and exacting. The man that smokes a bit, rests a bit, and fumbles the cigar more or less, is easily affected by circumstances. If the cigar goes out frequently the man has a whole-souled disposition, is a devil-may-care sort of a fellow, with a lively brain and glib tongue, and generally a fine fund of anecdotes. A nervous man, who fumbles his cigar a great deal, is a sort of popinjay among men. Holding the cigar constantly between the teeth, chewing it occasionally, and not caring if it is lighted at all, are the characteristics of men who have the tenacity of bulldogs. The top stands his cigar on end, and an experienced smoker points it straight ahead, or almost at right angles with his course.

ECONOMY IN COAL FUEL.—One of the most difficult things to teach a girl is economy in fuel. Nothing seems to satisfy but a continual piling on of coal. As soon as a little gas has been burned off a vigorous shaking and a raking out of ashes follows; then the stove filled anew, touching and lifting the covers, which soon become red hot, and the process is repeated from morning till night. Teach her, in order to obtain and secure a good draft, the coal ought never to be above the lining; and in this connection I am reminded of another practice, which seems to come to kitchen girls by intuition or handed down by tradition, that is, to put sadirons, or flatirons, as generally called, on the stove over the hottest fire hours before use, consequently they are ruined, for if once heated to redness will ever after retain heat but a short time, and lose their smoothness too. I would rather lend anything else to a neighbor than a flatiron. In ironing have two holders to use alternately, thereby lessening the heat of the hand, and insuring a greater degree of comfort.

TO PREVENT SCREWS FROM RUSTING.—Great trouble is often experienced from the rusting of screws when they are placed in damp situations. When they are employed to join parts of machinery, they often become so tightly fixed that they can only be withdrawn with considerable trouble, fracture sometimes resulting. In order to avoid this inconvenience, screws are generally oiled before being put in their places, but this is found to be insufficient. According to the *Moniteur Industriel*, a mixture of oil and graphite will effectually prevent screws becoming fixed, and, moreover, protect them for years against rust. The mixture facilitates tightening up, is an excellent lubricant, and reduces the friction of the screw in its socket.

AN EFFECTIVE SOFA ORNAMENT.—A very effective ornamentation for a small sofa is made by taking a strip of satin, plush or of velvet, about five inches wide, and nearly the length of the sofa itself; on this embroider a vine in some distinct and quite open-work pattern. When this is done put a narrow strip of similar material, but of a different color, around it as a plain border. Line it with a stiff cloth, and apply it to the sofa with unseen and immovable pins. It should not be placed in the center of the seat, but be drawn forward so that it is just above the puff or band of plush which finishes the sofa cushion.

MOCK IRON is the name given to an alloy for filling blow-holes, etc., in castings. It is made of one part bismuth, two parts antimony and nine parts lead. It has the property of expanding in cooling, so that a hole filled with the melted alloy will not show any cracks, and the plug will be tight.

"FEATHERBONE," the name of a new article of manufacture, prepared from the quills of geese and turkeys, is largely taking the place of whalebone in the manufacture of whips, etc., for which whalebone was formerly used exclusively.

IRON BOOKBINDING.—Metal is now being substituted in England for cardboard in bookbinding. This novelty is known as the "British

Pellisfort" binding, and it consists in the use of thin sheet-metal for covers. The metal is specially prepared, and the cover may be bent and straightened again without perceptible damage. It may, in fact, be safely subjected to such treatment as would destroy ordinary covers. The metal is covered with the leather usually employed in bookbinding, and the finished book presents no difference in appearance except in the greater thinness of the cover.

TO POLISH PLATE GLASS and remove slight scratches, rub the surface gently, first with a clean pad of white cotton wool, and afterward with a pad covered over with cotton velvet which has been charged with fine rouge. The surface will, under this treatment, acquire a polish of great brilliancy, quite free from any scratches.

LEAKAGE OF PETROLEUM.—Ten years ago, according to Sir Frederick Abel, the loss of petroleum spirit from leakage and evaporation was as much as 18 per cent, but it has now been reduced to eight per cent in many storehouses, and in Germany the leakage is said to be less than one per cent.

AN INCANDESCENT LAMP which requires no vacuum in the globe is said to have been invented in Germany. The wire used is a mixture of conducting and non-conducting elements, the latter preventing the former from melting.

ROUGHING OFF TOOLS.—A round-nosed tool ground on a radius that will exceed the greatest depth of cut, and left with a shearing edge, will make the best tool for roughing off the work end removing the largest amount of material.

TO DEMAGNETIZE STEEL.—First heat it to a red heat, allowing it to cool slowly. Then place the steel on a magnet, with the light poles touching each other, repeating the operation until total demagnetization has taken place.

FLOATING PUMICE STONE.—Large floating fields of pumice, thrown up by the great volcanic eruption at Krakatoa, Java, have been seen in the Indian ocean, nearly 700 miles from where they were seen a year ago.

THE SCREWDRIVER.—The reason that a screw is driven more easily into wood by a long than by a short screwdriver is because the long screwdriver, by reason of its greater length, affords more leverage than a short one.

THE OLDEST PICTURE IN THE WORLD, or what is supposed to be such, is in the museum at Boulak, in Egypt. It is a fresco from a tomb at Maydoom, representing six geese.

GOOD HEALTH.

Second-Hand Air.

Breath is life. At least the breath is the evidence of the union of spirit and body. With the breath, life departs. Added breath gives added life. The power of breathing, or the capacity of the lungs, measures health, strength, longevity, and power of endurance.

Granted that the lungs are doing full duty, what are you breathing—the pure oxygen-laden atmosphere so abundant everywhere, or air poisonous with foul breaths, impure odors, or noxious gases?

The lungs of an adult inspire 22 cubic inches with each breath. A slight calculation only will reveal how soon one must breathe second-hand air if denied access to a fresh supply. How we recoil, and justly, too, at the thought of using even a drinking glass or a towel after another. Cast-off clothing brings to mind visions of filth, parasites, and contagious diseases. Even the outer habiliments of valued friends are worn reluctantly by sensible people.

How much more revolting to take into the lungs, the most vital and sensitive organs, air which has been used by the smoker or drunkard; by one afflicted with catarrh, consumption or scrofula. Such second-hand air is repulsive and may contain germs of disease, while the absence of oxygen and the presence of carbonic acid gas render it positively injurious.

To conserve heat and yet provide pure air is yet one of the unsolved problems. A lack of oxygen taxes to the utmost the vitality of attendants upon our elegant churches and theaters. Our public conveyances are filled with air not only second-hand, but hundred-hand. Our luxurious sleepers are whited sepulchers. Our living and sleeping-rooms are built with reference to the demands of comfort and health except in regard to the one universal need of fresh air. Indeed, the majority of modern dwellings are sealed habitations. From the weather-strips and other means used to prevent the ingress and egress of air, one would judge the human family to be a kind of perishable fruit, requiring potent hermetical sealing to prevent decay.

For stove-heated homes a special warning must be given. As the blasts and blizzards of winter are upon us, if life and health are valued, an effectual mode of introducing pure air into dwellings must be sought. The simplest is to raise or lower a window sufficiently to allow a current between the two sashes. Especially should the sleeping-room have a constant supply of pure air. Two or three times a day open doors and windows so as

to allow the escape of every particle of second-hand air. The loss of heat will be more than compensated in the power to resist colds and acute attacks.

A false idea currently prevalent is that cold air, fresh air and drafts cause colds and influenza. He who is sensitive to drafts, who chills at sight of an open door or window, is nearly always one who is striving to live on second-hand air. This produces an inflamed condition of the system, and the life principle is enervated, the power of resistance gone.

It does not require so large an amount of fuel to raise pure air to a given temperature as to raise impure air. But a higher temperature is needed to give a sensation of warmth in a close room than in one that is well aired. Every heating apparatus should be in itself a ventilator. The open grate gives simple, practical and satisfactory results, and is an economical investment considered from the standpoint of health. Partial ventilation is secured by connecting the apparatus of the indoor water-closet with the kitchen chimney, thus causing the constant current of warm air to carry off offensive gases.

The prevalent fear of night air is fallacious. Confined and deodorized night air is more to be dreaded than that which comes fresh and breezy from the steril heavens. Sleeping or waking, fresh air is necessary to existence; it is essentially a part of life.

We clip the above valuable hints from the *Watsonville Peajaronian*.

DIPHTHERIA.—This insidious disease, which is just now so prevalent in this city and State, awakens the most painful memories in thousands of hearts. Just at this time it appears to be raging with terrible energy everywhere throughout the northern hemisphere—in this country, not only on the Pacific Coast, but in the Eastern States as well. It is also raging with even greater violence in many parts of Europe. In one town in Hungary it has lately broken out with fearful force. Out of 20,000 inhabitants in one city, 2135 persons were recently sick at one time with diphtheria, and 1000 of the sufferers died. With reference to remedies a German paper recently gave the following: "We deem it a public duty to make known every remedy which may snatch even a single victim from death. Thus, we learn with much interest that strong port wine or fiery meadira and malaga is being used on the part of physicians with great success against diphtheria. Even in a case where a poor child had already been given up, and they had been unable to decide upon the well-known tracheotomy operation, the life was saved by a glass of strong port wine. It is related in one instance that special medical officer Dr. Fiedler, in Dresden, was extraordinarily successful with the child of a State official. The child was already lying in the throes of death when, through the fire which the port wine communicated to the veins, in a short time a heavy perspiration broke out and the fungus and phlegm, which would otherwise have brought about suffocation, were ejected."

A SUNNY ROOM A POEM.—Let us take the airiest, choicest and sunniest room in the house for our living-room, the workshop where brain and body are built up and rewarded; and there let us have a bay window, no matter how plain in structure, through which the good twin angels—sunlight and pure air—can freely enter. This window shall be the poem of the house. It shall give freedom and scope to sunsets, the tender green and changing tints of spring, the glow of summer, the pomp of autumn, the white of winter, storm and sunshine, glimmer and gloom—all these we can enjoy as we sit in our sheltered room, as the changing years roll on.

FOR SCALDS, BURNS, ETC.—The following was recently sent to the *Call*, of this city, by a Boston lady, who stated in her letter that it was not only a specific for scalds and burns, but also for bee stings, bites of insects, and even reptiles: "Make a strong decoction of lobelia herb; apply at once, cold, and keep the part wet with the fluid till the fire subsides, which will not be long. Then the cuticle will, in most cases, be sensitive, and should be covered with collodion, the ether in which is cooling and soothing, and will finish the cure and prevent the skin from breaking. In nine cases out of ten the lobelia will prevent blistering."

TAKE A MOMENT'S REST.—A very important secret of life and good health is learning to rest in the midst of confusion—such confusion, say, as that which follows turning the pantry loose upon the kitchen, preparatory to cleaning the former. Stop when that terrible exhaustion comes over you, leave the kitchen, go to the most restful spot in the house, and there sit for a few moments in absolute quiet, taking in deep draughts of that soothing but invisible influence permeating the whole atmosphere, but which we cannot receive unless in a state of mental tranquillity.

HOW WILL HE LEARN?—The medical student of Maine must dissect before he can become an M. D., but the law provides that no bodies shall be dissected except those of executed criminals, and another law abolishes capital punishment.

NEURALGIC OINTMENT.—The *Journal of Chemistry* gives the following: Menthol, 45 grains; cocaine, 15 grains; chloral, 10 grains; vaseline, 5 drachms. To be applied to the painful part.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

VOLCANO.—Cor. Amador Ledger, Jan. 29: W. Q. Mason's mine, near this place, is sure to be a good mine. The tunnel is 200 feet, and the ledge will be tapped about 80 feet below the surface. A few days ago we had a conversation with Mr. Gillick in reference to his mining property in this place. This mine is located on Sutter creek, one mile below town, near the owner's house. The mine consists of two ledges, each about four feet wide and running parallel. One is on the surface. On this ledge a shaft has been sunk to the depth of 40 feet. The ledge is increasing in thickness, and contains free gold in abundance. The mine owned by Benj. Ross, about half a mile from Volcano, and near the Downs mine, gives evidence of a promising future. Sinking has been progressing for the past six months. The ledge is three feet in width, and experts say it will pay \$50 per ton. The Robinson mine, on Clapboard gulch, is coming into prominence among mining men, and its future is very flattering. John Griesbach has struck it rich again in the extension of the Old Pioneer ledge that yielded so handsomely about seven or eight years ago. Frederick & Williams are operating upon a newly discovered quartz mine about a mile from Pete Denzer's place. The tunnel is in about 100 feet, and gold can be seen in the rock. The boys feel jubilant over the outlook. Mr. Gillenwater, of San Francisco, lately purchased from Terry Gillick the mine commonly known as the Whitmore mine, located in Humboldt gulch, about one mile from town. A force of men are at work day and night running a tunnel into the hill to strike the ledge at a distance of about 200 feet from the mouth. This mine in early days was considered rich, some very nice specimens having been found.

MCKAY.—Amador Ledger, Jan. 29: At the Amador or McKay mine, south of the Moore, the shaft is down nearly 120 feet. Some of the ore extracted lately shows considerable free gold, and the owners have increasing confidence in the value of the property. It is the intention to go down 300 or 400 feet, before making any attempt to run drifts. The Quartz Mountain mill and mine were attached last Tuesday by A. McWayne, of Drytown, for a debt of over \$800 against the Graham brothers, the owners or bonders of the property. While from all accounts the mine has been paying something over expenses, it is said that \$2000 per month in free gold was obtained from 10 stamps, and that the sulphurets were very rich and would yield \$1500 or \$2000 more. At this rate, it certainly ought to have paid its way, and this debt is a surprise. W. A. Nevills left San Francisco last Saturday, with the intention of proceeding to the East and from thence to England. His trip is purely a business one.

SUTTER CREEK.—Surface work has been commenced in earnest at the Wildman. C. E. Fournier has secured the contract for building the hoisting works, and with several other carpenters commenced work framing timbers Monday morning. Knight & Co. are busy with the iron work. They are also making 2000 feet of 13-inch pipe to connect with the Amador canal. Twenty stamps at the Lincoln mill are kept running steadily, and the rock seems to improve both in quantity and quality as the ground is opened up.

THE KENNEDY.—Dispatch, Jan. 29: It is reported that the Kennedy M. Company has decided to make a change in the superintendency of their mine near this place, and that Mr. J. F. Parks, of Amador, will take the position of superintendent on the first of next month, in place of Mr. F. F. Thomas, the present superintendent. Mr. Thomas, we understand, is going to Calaveras county to take charge of some mine in that county, but we are not informed as to what mine it is.

Calaveras.

THE GWIN MINE.—Calaveras Chronicle, Jan. 29: A Mr. Couzelman, of St. Louis, arrived here last Monday evening, and remained two or three days. We learned that the gentleman named had come to get information concerning the Gwin mine, in the interest of a company to which he is to report the results of his inquiries and investigations. In the absence of Mr. Wm. M. Gwin, who is the owner of the mine, and who is at present East, Mr. Couzelman sought information from responsible parties as to the location of the mine which he visited, and during his stay in these parts spared no pains to seek and interview those workmen who were employed in the mine just previous to its closing down, for the purpose, of course, of learning points and facts concerning the mine that would be of importance to the company in whose interest Mr. Couzelman is prosecuting his investigations and inquiries, and to whom he is to make a report of the result of his labors. Although we have no assurances of the matter, the prospects are that in the not distant future there will be operations commenced on this valuable mine. That it is a valuable piece of mining property, explorations have proven. The shaft upon the mine reaches a depth of over 1500 feet, with a splendid body of paying ore, and the requisites are heavy appliances in the way of machinery to undertake the work. We hope to see something done upon this property, which offers the best of inducements for profitable quartz-mining investment.

MURPHYS.—Mountain Echo, Jan. 26: Since the rain has set in we have a marked improvement in all mining matters, which doubtless will continue throughout the coming season. The Oro Plata paid off last week, and in consequence times are livelier. The working force of the mine is now complete. Since the Burleigh is in operation on the 100-foot level of the Red Wing, adjoining the Oro Plata—some days may be necessary to prepare the workmen in their duties in running the machinery—there can be no doubt as to the final success of the adoption of this method of extracting the ore on this level. The company has spared no expense to facilitate work, and the development is largely due to the energetic superintendent, F. B. Morse. The 10-stamp mill on the Esmeralda, on Indian creek, is completed and will be run in addition to the pulverizer that heretofore gave such a good account of itself and turned out so much bullion. This mine is situated near Davis' store,

which locality in early days was rich in placer diggings. The owners are young men from the Bay city, but seem to hit the spot in the right place. The rock is free milling, of good quality, and has a reputation second to none in this vicinity. Other mines in this vicinity bid fair to rival in richness any in the county. Increased activity is noticeable since the rains have set in. Gulch miners are at work and times are better in consequence. The claim on Central hill, owned by McCormac, Bisbee & Thomas, is now in operation, and will soon give a good account of itself. They employ about 10 men; it is a paying institution, and its owners are deserving of the success they have met with, and richly merit their reward. Other mines in this section give promise of good returns and claim the attention of mining men, who often visit us. The late rains have aided in adding to the increase of products in minerals, etc., and will be productive of good.

El Dorado.

GRIZZLY FLAT.—Placerville Observer, Feb. 1: The Mount Hope Co. has a tunnel in 300 feet on the vein, and a shaft 200 feet deep. They have a good ten-stamp mill and hoisting works. It is reported that work will soon start up under the management of H. H. McClellan. The Melton Mining Co. has been laboring for three years on a tunnel, which is now completed, striking their ledge 400 feet from the surface. The ledge is five feet wide and the ore pays on an average \$30 per ton. The Kemp mine has a tunnel in 600 feet, with a six-foot ledge. A test of ore from this mine shows it to be of low-grade, but with facilities for cheap working will justify the erection of a mill, which is now in contemplation. The Sunday mine has a tunnel in the hill 400 feet. At the mouth of the tunnel a shaft is down 100 feet, also a winze 40 feet deep in the tunnel, showing a ledge from 2 to 4 feet in width all bearing gold, some of it high grade. The Bullard mine has a snug 8-stamp water-power mill, ditch and extensive tunnel. The ledge is small and the walls hard, which makes it of doubtful character. The Idaho mine recently bonded by a San Francisco Co. has a ledge eight feet wide of gold ore supposed to be of low grade. The Ohio mine was worked in 1853 by Capt. Tellis, and paid well as long as it was worked with the aid of a wheelbarrow. It was afterward sold to the Valde-lora Co., of Boston, and by them abandoned. It was subsequently located by Alex. McAfee, who is now sinking a shaft to strike a rich ore body known to exist. The Hale and Norcross mine, still further south, was worked with a small arasta, propelled by a jack, in 1852, and was shortly afterward abandoned. Within the last two years this ground was located by Dennis Gallagher, who sold it to Joseph Lyon, John Melton and others, who have sunk about 35 feet, and have found the richest average ore perhaps in the district, giving as high as \$300 per ton—but are unable to contend with the water without expensive machinery which they have not means to purchase. The Carrie Hale Placer Mining Co., at Henry's Diggings, have their ditch in good order and are attempting to work their gravel, channel through an incline. They have good gravel, but their plan of working is doubted by mining men.

Fresno.

THE MINERAL BELT.—Fresno Republican, Jan. 28: Of all mining counties in this State there is none which offers such inducements to those seeking investments as Fresno county. Her mineral resources are unlimited, and we only require more capital to place her at the head of the bullion-producing counties of this State. There is not a gold mine in the county which has been worked by experienced mining men but what has proven a success in every particular. A few more such men as Hearst, Ewing, Gillet, Haley, Grayson and McNally is all we require to place her at the head of the list as a gold-producer. Undoubtedly the most important gold belt in the county is that which the Texas Flat and Surprise mines are located on, and what is commonly known as the Blue Gauge lode, and it is indeed a lode worthy of the consideration of all seeking after permanent mines. This lode is a contact vein lying between granite and slate, with well-defined walls, and can be readily traced for ten or more miles. On leaving the Surprise mine in Grub gulch and traveling a southeast course, we come to the Butterfly mine, on the Fresno river, now being judiciously developed by Mr. Poole. Continuing on the line of the lode some two miles, we come to where the Hawkeye Mining Co. is opening it with most flattering results. West in line is the Texas Flat mine, near Coarse Gold, which is being developed in the most systematic manner, and when sufficiently developed will be worked on a large scale. Two miles on is the Blue Belt mine, recently discovered, which at a depth of ten feet shows a four-foot ledge of rich quartz. Preparations are being made to sink 100 feet on this newly discovered bonanza. Continuing on the line of the lode we come to the McFarland mine; thence the Nate Harbert; thence the Last Chance, which has its ten-stamp mill running day and night. Then to the Mountain View mine, on Fine Gold gulch, which is reported sold for a large sum. Few sections in this State can show such an immense lode as this, and few lodes are worthy of as much consideration as this one. Many claims between the mines mentioned are being developed, and all with good results. A grand boom is predicted along this lode the coming season, and capitalists who may visit it will not go away disappointed.

Inyo.

THE MARBLE MILL.—Independent, Jan. 29: Mr. Luce, superintendent of the marble quarry, says the mill, so far as completed, is running in good shape. A gang and one rip saw are in operation, and they are doing good work. The quality is fine; there is no fear as to quality or quantity. Mr. Luce was assured that all the machinery for additional saws would be delivered at the quarry about the middle of December. But the makers failed to be on time, and up to the beginning of the present week the last piece of machinery had not been delivered. There is plenty of demand for all the marble the mill can turn out when working up to its full capacity.

ORE SHIPMENTS.—From the Brown Monster, Tom Bastian and his partners shipped two carloads of ore to San Francisco a few days ago. At Darwin a good deal of ore is being taken from the Lucky Jim and Defiance mines. A miner who went through all the workings of the Defiance lately,

says the mine now looks better than ever before. From Lookout, Frank Fitzgerald is shipping ore regularly, teams are constantly employed hauling from those places to Keeler. Tom Crough recently took out and shipped some fine ore from the claims he is interested in at Red Hill. Wilnot, Whitaker & Thorpe had a large stock of supplies taken to the White Hill at the end of last week, and have begun work under a lease for one year from Barnes & Kehoe.

Napa.

THE GOLD AND SILVER MINE.—Independent Callistogian, Jan. 29: Of the 540 feet of tunnel through the hill to connect the Grigsby & Johnson mine in King canyon with their mill to be erected in the canyon on the other side, a little more than 200 feet of drifting remain to be done. Work progresses night and day, but very slowly, as the rock is hard. Very little more than a foot a day is excavated. At this rate the tunnel will not be completed until the latter part of May, and not then if rock harder than that now found is met with on the course. Over the creek near where the preparations are being made to construct the mill plant, a heavy substantial bridge has been built. It is 30 feet long and about 25 feet to the water below. Over this all the lumber and machinery for the mill will have to be taken. The mouth of the tunnel on the side of the hill will be above the mill, and ore brought through it on cars will be dumped in the chute and discharged into the mill. A dozen men find employment about the property now, though this number will be more than quadrupled in a few months.

Modoc.

COAL.—Adin Argus, Jan. 27: Wednesday morning P. S. Early started for the recently discovered coal mine in Hot Spring valley, on a prospecting tour. He has leased the mine for a period of 60 days, and will immediately put some men to work sinking on the vein.

Mono.

THE STANDARD CON.—Bodie Miner, Jan. 26: Ore shipped to mill for week, 275 tons. Several appearances of ore bodies without material change. Mill running steadily.

THE BULWER CON.—North drift, 200-foot level, was extended 10 feet, showing the vein two feet wide. There were employed six miners, \$4 per day; one foreman, at \$6; and jointly with Bodie and Mono, one blacksmith, at \$4.50; one helper, at \$4.

THE BODIE.—Upraise from west crosscut on second incline level was extended 13 feet. North drift, from upraise from 620 level, was extended 14 feet.

THE MONO.—South drift on 800 level was extended 23 feet; west crosscut from south drift, 800 level, was extended 14 feet. There were employed five miners and one carman, and jointly with Bodie, three engineers, two firemen, one pumpman, one carpenter, one watchman, two carmen, one foreman, and jointly with Bodie and Bulwer Con., one blacksmith and one helper.

CON, PACIFIC.—West crosscut, 135-foot level, has been advanced nine feet; total distance from shaft 36 feet; south drift same level advanced six feet; total distance from shaft 35 feet.

Nevada.

WOOD'S RAVINE.—Nevada Transcript, Jan. 29: The work of prospecting at the Muller & Walling claim on Wood's Ravine, a mile or more in a north-westerly direction from town, has been going on for the past two years by a series of cuts and shafts. Last fall a crushing of 20 tons of ore was taken out. It showed well in free gold in the coarser and decomposed sulphurets, and yielded \$16 to \$20 a ton. This claim is on the same vein as the Nevada City mine, which it joins on the north. It is the intention to sink a regular working incline and put on a pump and hoisting works. This will no doubt soon develop into a good mine and add another producer to this district. Messrs. Lord & Sharkey, further up the ravine, have made some fair developments during the past year. They have cut the vein in four different places by inclines, one 40 feet, one 35 feet, and two from 18 to 24 feet in depth. The vein, which is from 3 to 7 feet in width, has now been opened for a distance of 1200 feet in length. This is now considered one of the best prospects in the county by miners whose judgment in such matters commands respect by reason of the success with which their operations have been attended. The character and extent of the deposit of ore, which shows well in free gold and is in places heavy with sulphurets, indicate that a mill on this property would be profitable. It works from \$9 to \$26 a ton. Still further up the ravine, on the south end of the Mt. Auburn claim, considerable prospecting has been done during the last year with good results. The incline was sunk 80 feet and some good-paying ore was taken out. The Kirkham brothers are now running a tunnel on the vein which is from 3 to 4 feet wide and has paid from \$18 to \$35 a ton. Had one-half the money expended on the north end of this claim been applied to the development of the portion now being worked, there is good reason to believe the Mt. Auburn would have been in full and profitable operation to-day.

NEW QUARTZ MILL.—Grass Valley Union, Jan. 29: The young men who own and are working the W. Y. O. D. quartz claim on Kate Hayes hill are now putting up a five-stamp mill to crush the ore from the mine. The mill will be run by water-power, which will be conducted through 2400 feet of pipe, the water being received from the Empire mine drain tunnel. There are now on the dump 50 loads of good ore, and by the last of February, when the mill is completed and in running order, the amount will be increased to 100 loads. The W. Y. O. D. claim is doing splendidly, and so far the quartz has yielded a fine profit. The six owners are young men who do all their own work.

CROWN POINT MINE.—Grass Valley Union, Feb. 1: There have been rumors at different times of the sale of the Crown Point mine, of this district, and within a few days these have been renewed; but the Union is able to state authoritatively that the mine has not been sold, and is not likely to be unless it is taken at the figures that Mr. Gauthier has placed upon the property, which are largely above any offer that has been made. He is now anticipating the making of improvements by which the mine can be worked on a more extended scale than at present. The shaft is of but two compartments, four feet by eight, and only sufficient quartz could be raised through it to keep a ten-stamp mill going,

whereas if the shaft was in three compartments, with two car tracks, sufficient quartz could be raised to keep a 30-stamp mill going, as the ledge now in the north drift on the 300-foot level is from nine to ten feet between walls, and four men on a shift keep the mill going. The great size of the vein shows what an immense body of quartz will be opened up when another level is sunk, which will be in good time, after the present shaft is enlarged from two to three compartments. There is every appearance that the Crown Point is a great property, but its riches cannot be produced as rapidly as they should, because, as stated, the want of present facilities for raising the ore, but when the improvements are made which are in contemplation the mine will be an important producer. It is paying well now, and has been for a year or more.

Placer.

SATISFIED.—Placer Republican, Jan. 29: William Gray, who leased the Sharon mine at Alta, has got the mine pumped out and the machinery in working order, and he is well satisfied with the present prospect. At the Last Chance claim they have got their shaft down and struck good pay on the bedrock. They are now running drifts, and if the pay continues they will work on an extensive scale. Several other mine-owners talk of prospecting for drift diggings.

Plumas.

BUNKER HILL CON.—Plumas National, Jan. 29: This mine is situated in Plumas and joins the famous North American mine on the north. There are 20 shareholders and they have pushed the prospecting with energy. After running a tunnel about 800 feet in bedrock they raised up last week about six feet, striking a fine body of gravel that prospects very rich, one pan of dirt yielding \$3. The Bunker Hill promises to rival in richness the famous Bald mountain of Sierra county. W. Metcalf, of Nelson Point, is superintendent and part owner. The owners are all hard-working miners and some of them have been interested in the ground since 1857. They deserve their good luck in payment for their unlimited faith and persistent energy in prosecuting the work.

GENESEE M. CO.—Greenville Bulletin, Jan. 27: Messrs. Bidwell & Watson of the foundry are turning out a new set of cams, tappets, shoes, dies, etc., for the mill on the above property, which is soon to be started for the coming season's work. It is said that quite extensive improvements on the property are contemplated this summer. The mill, including the water-wheel, will be thoroughly overhauled and hoisting works erected. The past record of the mine and the well-known financial standing of the present owner, Joe Gruss, would seem to fully justify the contemplated additional outlay.

Shasta.

SILVER.—Redding Free Press: Reid and Hi Bemis have purchased Mike Shay's interest in the Bakakala mine. There are 15 partners in this silver mine. Mr. W. R. Conant came down Wednesday from the Uncle Sam mine, on Squaw creek, bringing with him about \$1000 in bullion, being the clean-up of the plates alone after a two days' run with 10 stamps. The mill is running day and night, and the above is about the average produced. S. P. Fillman informs us that a Huntington mill, rock-breaker, concentrator, engine and pumps have been purchased for the Texas and Georgia mine, and that competent miners have been employed to attend to the mine. Active operations will prevail, and it is expected that large results will be realized. Mr. Jewett, superintendent of the Black Bear mine on Squaw creek, was in town last week. He appeared to be highly elated when speaking of the improvement of the output, which the brick he brought down verified. They have sunk a shaft, and are now running a crosscut with the best kind of results. The mine adjoins that of W. R. Conant's. Mr. Baker, of Ono, who was here last Monday, informs us that there is a great deal of travel through that place to Bullychoop, and that a boiler weighing four tons, besides 20 tons of other machinery, passed through last week for the Cumberland mine, owned by Foster & Cornwall, who are now laying the foundation for a 20-stamp mill, but only 10 stamps will be put up at present.

IRON MOUNTAIN.—Courier, Jan. 29: Iron Mountain will be booming in a few weeks. The original discovery mine bears the name of Lost Confidence, but Charles Camden, Colonel Magee and James Sallee have never lost confidence in the great richness of the immense ore body which they have developed. The ore is now being worked under the superintendence of Sallee by a different process from that employed by Ellsworth, and is rolling the bullion out in a style which would make the eyes of an old Comstockite stick out as big as an ostrich egg. We understand that other mines on the mountain will be worked in the spring, and the indications are that a large number of men will find employment there in a short time, but at present there is an oversupply of miners in every part of the mines that we have heard from.

GRAVEL.—Dr. Bell has for years owned a gravel claim on the flat on Grizzly gulch, just below the mouth of Studhorse gulch, and about three miles above Desmond's hotel. Owing to ill health the doctor could not very actively attend to the development of the mine. Some time ago he took in a partner by the name of Damon, a practical miner and good worker from Colorado, who recently struck a bed of gravel rich in coarse gold. The prospect justified the erection of hydraulic works; iron pipe was ordered at Volentine's, and this week Mr. Damon came down with a team and transported the pipe to the mine, and the gravel will soon fly at a lively rate. They will have a continuous water supply and good pressure, and it is the wish of the friends of the owners of the mine that they have struck a bonanza.

CLEANUP.—Democrat, Jan. 26: Last week a 60-ounce gold brick was cleaned up from the Black Bear mill, Squaw creek, after a seven days' run with a Huntington mill, crushing on an average of about five tons a day. In the lower tunnel of this mine they have a 12-foot vein that prospects from wall to wall.

BAR.—Scott Bar on Scott river was noted in early times as being immensely rich, and millions have been taken out there. Lately the Magofey Brothers have struck a big bed of rich gravel in the hill back of the bar.

Sierra.

NEW DISCOVERY.—Sierra Tribune, Jan. 29: We hear that a new quartz lode has been discovered near

the mouth of Kanaka ravine, which is about half-way between Sierra City and Downieville. The lode was found by a prospector from near Camptonville, named James. The report is, that the lode is four feet thick, and the ore is very rich in many places. Some very fine specimens have been shown around town this week. The vein has been traced for the length of four claims, and is said to run at right angles with all the other veins in the vicinity.

Trinity.

BULLYCHOOP.—Cor. Red Bluff *Sentinel*, Jan. 29: As you are already aware, the mill started up last June and run until the present, crushing ore at the rate of 16 tons in 24 hours. The yield was from \$4 to \$16 per ton and plenty of ore in sight to run for years to come. There is now on the ground, ready to be set up, a new 10-stamp quartz mill. There is plenty of wood, good water, good roads, a good hotel; and a sawmill will soon be put up to supply the mine with building material. There are at present about 40 men and four families in camp. The men are all at work, and the hotel does a good business, board being \$20 per month. In the spring there will be work for double the number of men that are here now. The winter has been very mild so far, and at present there is no snow on the ground, but the indications are favorable for a storm. Bullychoop is situated about 50 miles northwest from Anderson, in Trinity county, and is sure to be the boss mining camp in Northern California. There are other mines in the immediate vicinity which are yielding very rich ore, and everybody is in good spirits and happy.

Tuolumne.

GOLD.—Tuolumne *Independent*, Jan. 27: We hear good accounts of the Maryatt mine, at Tuttle-town. On the lowest level the chute has been found 200 feet long showing gold. On Sunday, one and one-half tons of powder, a Burleigh drill and other implements were received at the mine from San Francisco, and work will be prosecuted vigorously. We have strong hopes that this mine will prove a valuable property.

THE HYDE MINE.—Sonora *Democrat*, Jan. 29: Some interesting tests, not by assay but by practical mine workings, have been lately made by Mr. Louis Blanding on the ores of this mine to determine their value. The tests were made on samples of 50 pounds each taken from the dumps with great care to obtain average values. The ores from which the samples were taken came from different points of the mine in depth and length along the line of the vein. The results obtained are important, as they go to show the great value of the mine and also the fact that the San Francisco gentlemen who had a bond on it which expired on 15th December, made a great mistake in not taking the mine, having been strangely misled by the late superintendent as to the value of the ores, and this has been shown to be the case by the results obtained by working lots of ore selected by the superintendent as low average and pronounced by him to be of little value, yet proved to be worth by mill work nearly \$8 per ton in free gold. The ores tested by Mr. Blanding, samples taken by himself, came from the crosscut at face of north drift on level 350-foot level 210 feet from shaft, where the vein is 26 feet wide of solid ore and the result showed a yield in free gold, per ton, from \$8.40 to \$11.18. And also from the face of the south drift on same level where the vein is four feet wide and the working on this ore in mill gave a result of \$28.30 in free gold and showed 2½ per cent of sulphurets worth \$100 per ton and a combined value in free gold and sulphurets of \$33.05 per ton of ore. These tests were made on the ore coming from the deepest point of development of mine, the good quality of the ores in the upper portion of the mine having been heretofore demonstrated on hundreds of tons in mill.

NEVADA.

Washos District.

SAVAGE.—Virginia *Enterprise*, Jan. 29: 500 level—East crosscut No. 2 has been advanced 52 feet, the last 30 feet being in quartz, carrying ore. 800 level—Engaged in easing timbers and timbering drift. West crosscut No. 3 on this level has been extended 18 feet. Have encountered quite a heavy flow of water. The face of this crosscut is now in quartz, carrying some fair ore. 600 level—Stopping ore. Hoisted through the Gould and Curry shaft all that the ore dump of that company will contain. Will commence hoisting ore from this level through our own shaft on Monday next. 1640 level—The main north drift has been advanced 100 feet and the south drift 65 feet from the Suro tunnel. Near the face of the north drift have started an east crosscut, and another from the face of the south drift, in the quartz body.

HALE AND NORCROSS.—1300 level—South drift has been advanced and timbered 50 feet. It is entering softer ground and a heavy clay formation. West crosscut No. 2, south boundary, has been extended 35 feet. 1200 level—The south drift has been advanced and timbered 25 feet, and east crosscut therefrom 30 feet. North drift has been advanced and timbered 20 feet, and east crosscut 25 feet. Both of these drifts are in quartz that give some fair assays.

CROWN POINT.—More prospecting work is being done on the 300 and 400 levels now than during the last week. The intention is to run the lateral drift on the 400 level south into the Belcher. It being near the surface, the veins encountered are narrow, running from 2½ to 6 feet wide. The Mexican mill is kept running steadily on ore from the lower levels principally; that produced from the upper levels works from \$15 to \$20 a ton.

OCCIDENTAL.—Upper tunnel—The south drift from the north incline winze has been extended 11 feet; total length, 92 feet. The east crosscut has been extended to feet; total length, 36 feet. From the north drift, same level, the west crosscut has been extended 12 feet; total length, 16 feet. At the 800 station in north incline winze are preparing to start a drift south. Extracted 12 tons of ore.

BEST AND BELCHER.—600 level—No. 2 west crosscut has been extended 44 feet; total length, 114 feet; porphyry formation in face. 800 level—West crosscut No. 4 has been extended 28 feet; total length, 160 feet; porphyry formation.

THE QUINN.—This famous old mine, below Silver City, is being actively reopened. Inside of a week the retimbering of the shaft will be completed to the

depth of 100 feet from the surface, heavy 12x12 timbers being used. The new machinery for the steam hoisting works is about being delivered on the ground, and will be set up as soon as men and money will allow. This machinery is of a capacity for sinking 1500 feet or more.

GLADSTONE.—For the week ending January 31st, we have driven the tunnel 10 feet. The waterflow remains about the same. The ground in the face of the tunnel is still in the veinstone and shows signs of near approach to the ledge, which we expect soon to cut. Are working the same number of miners.

SIERRA NEVADA.—520 level—West crosscut No. 6 has been extended 11 feet; total length, 62 feet. The south lateral drift from crosscut No. 2 has been extended 45 feet; total length, 74 feet; porphyry formation with stringers of quartz.

BELCHER.—The Vivian mill is crushing about 40 tons of ore a day, and the Santiago about 100 tons. The ore comes principally from the 1400, 1500 and 1600 levels.

YELLOW JACKET.—Shipping about 150 tons of ore daily to the Brunswick mill. This ore comes from the 1200, 1300 and 1400 levels. Everything going along smoothly.

POTOST.—Running south drift No. 2 on the 250 level. It is 100 feet east of south drift No. 1, running parallel with it, and is in about 80 feet; the face in quartz.

ALPHA AND ENCHEQUER.—On the 122 level three separate drifts are being extended; one east, one south and one north. All are in quartz.

UTAH.—472 level—At a point in the main west drift 400 feet from the shaft a north lateral drift has been advanced 36 feet. This drift is in vein porphyry.

GOULD AND CURRY.—425 level—The east drift has been extended 37 feet; total length, 142 feet. The upraise has been extended 22 feet; total length, 50 feet.

SCORPION.—Have finished the station at the 300 level, from which point a drift has been started east.

NORTH GOULD AND CURRY.—Working two shifts of men. Are sinking and prospecting. Everything looks favorable.

IMPERIAL.—Repairs to the shaft continue. Work is being done now near the 900 level.

EAST BEST AND BELCHER.—Cleaning out shaft, preparatory to doing important work.

CHOLLAR.—Shaft cleaned out and retimbered to a depth of about 500 feet.

Alum Orisk District.

PANNED OUT.—Esmeralda *News*, Jan. 29: D. W. Milsaps has been at work on a claim which he has relocated in Alum creek district named the Relocated Pride of Nevada. During the week he encountered a six-inch streak of decomposed quartz, from which he extracted 15 pans full of dirt and washed it out, obtaining therefrom \$140 in gold. He has shipped the dust to the Selby refining works.

Aurora District.

THE SILVER LINING.—Walker Lake *Bulletin*, Jan. 29: Very encouraging reports, relative to the Silver Lining, come from Aurora. The company is energetically pushing the work of developing this property, and a marked improvement in the tunnel which is being driven, rewards their efforts. The ledge alongside the tunnel is showing a great deal of free gold, and even the strata of quartz in the tunnel are highly mineralized and carry free gold. The property is improving steadily and never looked better than it does at present, and without doubt it will soon be one of the most valuable mines in Esmeralda county. So long as such promising mines as the Silver Lining are worked by capable and experienced men, the outlook for Aurora is more than favorable.

Como District.

PROMISING.—Virginia *Enterprise*, Jan. 29: The prospects for a new lease of life and activity in Como, Lyon county, shortly, are highly promising. Specimens taken recently from the 150 level of the Como-Eureka mine show free gold to the naked eye. The North Rapidan Co. thinks its mine shows as good prospects as the Como-Eureka, but will not proceed with development work until spring.

Gold Mountain District.

THE CORONET MILL.—Walker Lake *Bulletin*, Jan. 29: The Coronet Mining Co. has a new five-stamp mill nearly finished on the Amargosa flat, near Gold Mountain. It is expected that the stamps will begin dropping about March 1st. The Coronet Co. is a San Francisco incorporation which owns a number of gold mines near the new mill. The property has been thoroughly prospected; there is a large quantity of good free ore in sight, and it will require but a short time after the mill begins work to accumulate a dividend-paying fund.

Hawthorne District.

NEW DISCOVERY.—Esmeralda *News*, Jan. 29: Pat Shannon and Frank Thorn have recently discovered, in Hawthorne district, about 3000 feet easterly and in the Lapanta belt, a ledge over two feet wide which contains a 12-inch streak of the crumbled white quartz ore, the same as that of the richest of the Lapanta ores. They are sinking upon the ledge and are taking out a considerable quantity of this ore. Last Tuesday they sent the *News* a specimen of the ore weighing four pounds that is very handsome. The claim is named the Evening Star and bids fair to be one of the most brilliant gems of that golden region. Success attend you, boys!

Jackrabbit District.

ONONDAGO.—Pioche *Record*, Jan. 27: The Onondago mine, Jackrabbit district, is looking "way up." The ore continues going down, down, and keeps growing richer in silver. The indications promise immense. Considerable ore has been shipped the past two weeks. The poor little orphans who are interested in the mine believe that they have a grub stake for the remainder of the winter, whether snow flies or not. The assays made from the recent strike show \$295.27.

Mount Ross District.

PARADISE.—Cor. *Silver State*, Jan. 27: The engine shaft in the Paradise mine was completed last night, and crosscutting will immediately be commenced to cut the vein. The work of development is being vigorously pushed ahead at all available

points, with some very encouraging indications. The judicious and energetic exertions of the management are deserving of great credit, and are sure to be successful at no distant day, as the ledge surely exists below the break.

Tuscarora District.

NEVADA QUEEN.—Have started crosscut from gangway on 350-foot level to connect with the shaft; have advanced 13 feet. Rock is very hard. Connection has been made between the shaft and west crosscut No. 1 on 200-foot level. Station is being cut out and timbered and will be finished in two or three days. Shaft has been sunk 9 feet. Cutting out for station intersected somewhat with sinking. Bottom of shaft is 21 feet below the 200-foot level.

TORNADO CONSOLIDATED.—Tuscarora *Times-Review*, Jan. 29: Tunnel extended during the week 9 feet; total length 192 feet. West crosscut advanced 9 feet.

BELLE ISLE.—Belle Isle and Navajo joint crosscut west, 150-foot level, has been extended 25 feet.

NAVAJO.—North drift on new vein, 150-foot level, has been extended 11 feet.

NORTH BELLE ISLE.—North gangway, 400-foot level, has been advanced 33 feet. Rock is hard but breaks well, with a slight increase of water.

ARIZONA.

CUSTOM MILL.—Prescott *Courier*, Jan. 27: Mr. John S. Jones, a mining man who has made a favorable impression in this section, left for New York last evening, intending to return here in about six weeks. Mr. Jones has purchased a mill, and proposes to establish and run complete reduction works on Groom creek, six miles south of Prescott. He will purchase ore on dumps, or anywhere else.

STRIKE.—Clifton *Clarion*, Jan. 27: A very rich strike is reported to have been made ten miles north of Clifton and a group of mines located. An assay of the ore has been made and gives an average of \$40 in gold besides a fair showing in silver. The location of the mine is a good one, being within one mile of a fine mill-site. The owners of the property are B. W. Magin, H. Garvey and D. M. Potter, of Silver City.

COLORADO.

CLAIMS WORKED.—La Plata *Miner*, Jan. 22: A number of claims on Anvil mountain are being worked this winter. Chestnut & Hackett have a force of men working in the IXL tunnel. The heavy storms of late have made the ore shipments proportionately light. The Uncle Sam, on Cement creek, will be worked under lease the coming season. The owners of the Transatlantic are drifting on the vein and taking out some fine gray copper ore. Four men are working the Queen Anne at the head of Cement creek. The shaft is down 70 feet in a large body of coarse galena ore mixed with gray copper. Work is progressing very favorably at the Silver Lake. Six men are employed, and an immense quantity of ore has been piled up for shipment. Tim Malone has got quite a pile of ore on the dump of his claim, above the Washington on Kendall mountain. He is now doing development work, and expects to have a large amount of ground opened by spring. Good news continues from Humboldt gulch. The Carbonate King shaft is still following down their big ore body, and it is now half-way over the bottom of the shaft. The showing compares favorably with the best mines in the district, and the property seems likely to become one of the leading shippers of 1887. A portion of the Grand Prize force was employed Wednesday in sinking on the body of carbonates which was lately cut in the north drift. One hundred and eight sacks were filled the first day, which will weigh nearly five tons. This ore is worth about \$80 per ton, and the day's work at which only two men were employed is merely an illustration of what can be taken out when a full force shall be put to work on the big ore bodies.

SEVEN-THIRTY MINE.—Georgetown *Courier*, Jan. 27: Work has been somewhat delayed upon the Seven-thirty mine during this month, owing to the preparations for placing a new double hoisting engine at the main shaft. This engine is being built for Mr. Griffin, by Messrs. Fraser & Chalmers, of Chicago, and will enable him to sink 1500 feet if he desires. At a depth of 1400 feet connection can be made with the Burleigh tunnel, and outlet obtained level with the railway. From 1500 to 2500 feet of stopping ground will then be available—drained and ventilated. The Burleigh tunnel is in 2300 feet, and has 15 acres of patented ground at its mouth to which a switch has been built by the railway company for the convenient shipping of ore. Twelve hundred feet from the entrance of the tunnel, connection has been made with a drift from the Victoria tunnel, which has given a good circulation of air for both tunnels. In the Seven-Thirty the work of development is being continuously pushed forward. The orehouses are full of ore awaiting shipment. In the six months ending December 31st, ore was marketed to the value of \$58,637.76. Mr. Griffin has obtained government patents to 11 miles upon the veins centering in Brown gulch, and intends to develop them as far as practicable by the main shaft and drifts driven each way therefrom until connection is made with the lower tunnel. There are about three miles of underground drifts and tunnels already opened and operated with T rails and cars. This mine has been one of the steadiest producers in the camp for the past ten years. Judging from this and its present appearance we feel confident Mr. Griffin will be well repaid for the expenditures he is now making in permanent improvements. This mine is on a true fissure vein which can easily be worked to a depth of 5000 feet below the surface by a combined development of shafts and tunnels. It has already added \$1,000,000 to the output of our country, while as yet its main shaft is only 400 feet deep.

IDAHO.

SMELTER.—Ketchum *Keystone*, Jan. 26: The Bayshore smelter for the year 1886 shipped via Ketchum seven cars bullion aggregating 162,670 pounds, being the product of a very short run. All contracts having expired by which the Queen of the Hills disposed of its ore, the ore is now being stored until a new contract can be effected. The Germania, in Germania basin, owned by J. D. Wood,

produced 50 tons of ore in 1886, which was worth about 100 ounces silver and 50 per cent lead. Lead during the past year has fluctuated from \$5 per hundred, its highest point, to \$4.05, its lowest price. Its closing price at the end of the year 1886 was \$3.85. At the end of the year 1879 it was \$5.60. Jas. Brennan and Wm. Turner came down from the West Fork mine Saturday. Mr. Brennan has a contract to run a prospect tunnel 200 feet long in that mine. The tunnel is in about 70 feet and a 10-inch vein of good ore has been found. Every indication favors the discovery of a rich body of ore. The firm of A. J. Crook & Co., owning the Clayton smelter, Salmon river, shipped via Ketchum during the past year 18 cars of ore aggregating 438,270 pounds. This ore was chiefly from their Skylark mine near Bayhorse. They also sent out 21 carloads of bullion, 469,175 pounds, made at their Clayton smelter.

MONTANA.

A SUCCESS.—Helena *Independent*, Jan. 27: One of the marvelous successes in mining in Montana is the Minah, a property of which little is publicly heard. It is situated one and a half miles from Wickes. In February of last year it was the merest prospect. It was taken hold of by J. O. Briscoe and Chas. F. Blake, who immediately began developing it, while the prospect was covered deep with snow. They have worked from the grass roots down, and the following is the output for the ten months ending Dec. 31, 1886: Number of tons of ore marketed, 5143; gold, \$58,344.47; silver, \$151,848.00; lbs. of lead, 769,119. \$34,610.22. Total, \$244,802.69. Average value per ton, \$47.59. This ore has all been shipped, but a plant for handling the ore on the ground is now in contemplation. The mine now presents about 15,000 tons of ore in sight with the small development that has been made.

NEW MEXICO.

THE COONEY MINE.—Socorro *Bulletin*, Jan. 29: The Silver Hill Mining Co.'s properties, including the celebrated Silver Bar No. 1, otherwise known as the Cooney mine, received but little attention this year, the company's mill not having dropped its stamps. We are informed, however, that during the current year the latter property, and several other valuable claims, owned by the Silver Hill Mining Co., will be explored and exploited in the most industrious manner by our old friend and staunch miner, Capt. M. Cooney, and that the company under his supervision will at once commence the erection of an improved concentrating and milling plant of large capacity. There are numerous other valuable claims in the Mogollon districts, which in the present year will come to the front as producers, but this high-grade mineral section of this county will only appear at its best and secure that attention from capital which it merits when the Socorro and Magdalena branch of the A. T. & S. F. R. R. awakens the echoes of its towering cliffs with its screech of civilization, and upon good authority we believe that this much to be desired end will be secured before the close of spring.

OREGON.

GLENDAL.—Cor. *Jacksonville Times*, Jan. 29: The surrounding country, which is conceded to be one of the finest mineral districts of the Pacific Coast, is attracting widespread attention by the recent rich quartz discoveries, the most notable of which is the Green Mountain ledge, owned at present by Messrs. Jones & Wilson, who have lately bought out the other partners. Large quantities of quartz have already been taken out of this ledge, which shows plenty of gold and several other minerals as well. The owners will erect a mill near the ledge shortly. They employ a force of men tunneling and getting ready for mill work. The next in importance is the Mount Pisgah ledge, which is owned by Keenan & Ingelman of Grant's pass, and which prospects finely and promises to rival the Green Mountain. Another is the Bonanza, owned by Levens & Hays, who are having it thoroughly prospected, and which is presumed to be of fabulous richness. There are numerous other ledges, of which we will speak anon. Of placer mines the Whiskey Creek mines are the richest. They are owned by Sherer & Judson, of Grant's pass, and located on Whiskey creek, which has its source in the mountains northwest of this place, and which is a tributary of Rogue river. Mr. Norris, the manager of these mines, came out a week since, bringing with him \$500 in beautiful pieces of gold, the largest of which weighed 547. Another placer mine of importance is the Canyon Creek mines, owned by Chas. O. Walker, of Portland, who is personally managing the same. These mines are operated by hydraulics, and piping is carried on day and night. All expect to hear of splendid results from these mines when they clean up, which will be soon. There are several other mines of minor importance and Glendale is the shipping point for all.

UTAH.

REVIEW.—Salt Lake *Tribune*, Jan. 28: The week has been a quiet one in mining circles, the specially notable feature being light receipts of ore locally, though the shipments abroad have been fair. The weather has been cool but pleasant. The receipts in this city for the week ending Jan. 26th, inclusive, were \$172,308.76 in bullion and \$15,518.09 in ore, a total of \$187,826.85. For the previous week the receipts were \$179,870.31 in aggregate, of which \$145,243.28 was bullion and \$34,627.03 was ore. The Ontario bullion output for the week was 34,520.27 fine ounces, and \$17,187.88 in ore sales, a total of \$51,808.15. All goes well with this property. On the 31st the Ontario will pay dividend No. 128, or 50 cents a share, or \$75,000, thus beginning the new year in the old and agreeable way. This will be an even eight millions paid in dividends by the Ontario. The Daly output for the week was 20,511.13 fine ounces bullion, and \$5133.66 of ore sales, a total of \$25,644.79. The metal receipts for the week have been divided, as usual of late, into many classes, as follows: Fine bars, \$43,739.74; base bullion, \$18,700; sulphides, \$5832.32; gold bars, \$4400; pure silver bars, \$20,095; bullion, \$8088.92; this besides special bullion named herewith. The Germania smelter produced, during the week, \$20,295.25 in bullion; the Hanauer, \$18,260. The Stormont sent up, on the 24th, silver bars valued at \$3050.

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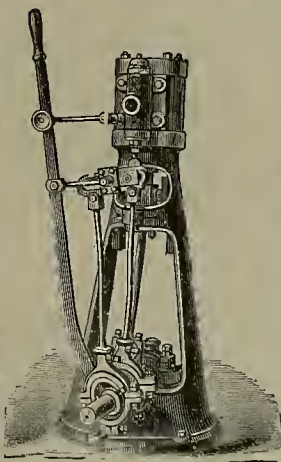
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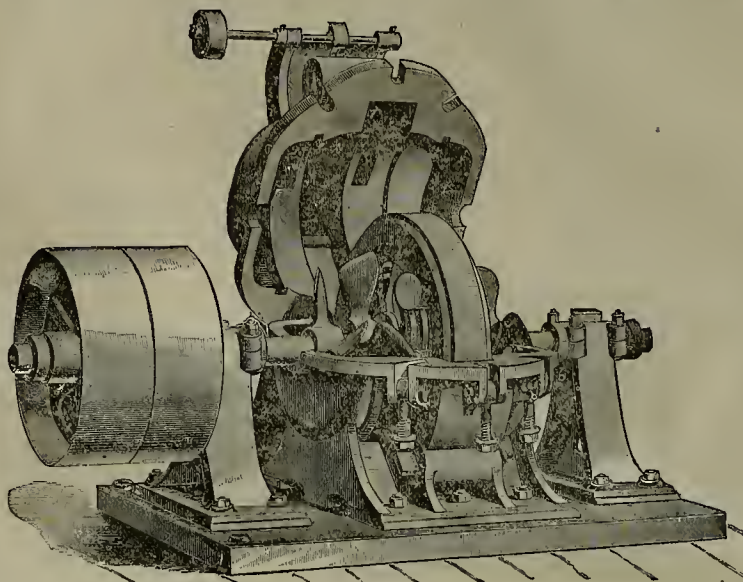
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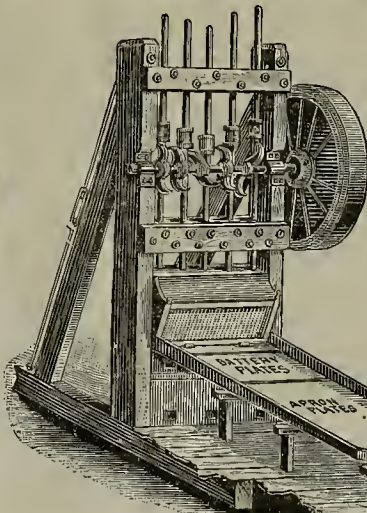
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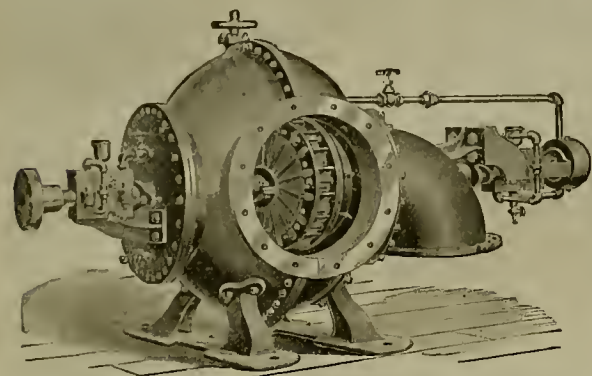
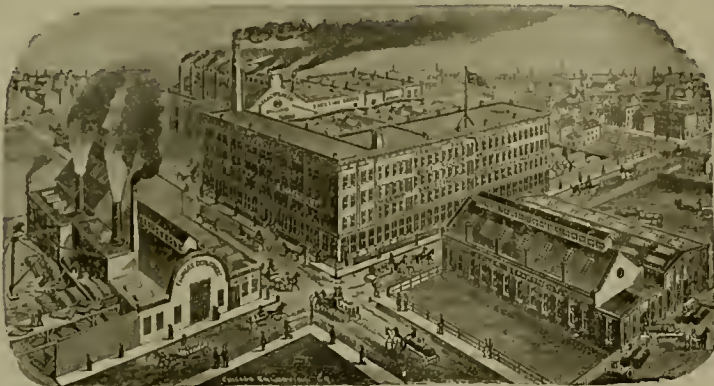
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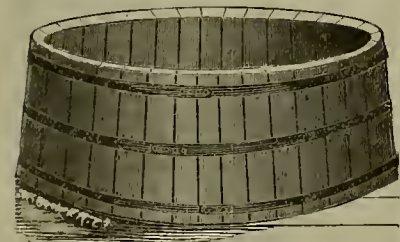


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Legislative.

The consideration by the committee of the appropriation to the State Mining Bureau is referred to at length under another heading.

Ohleyer's bill to facilitate the service of injunctions has been refused a second reading in the Assembly, the Judiciary Committee having reported against it.

A bill has been introduced by Boggs appropriating \$100,000 to provide and maintain a permanent fund for the purchase and manufacture of jute for San Quentin.

A bill has been introduced appropriating money to erect a monument over the grave of James W. Marshall, at Coloma, near the scene of his discovery of gold. As the State was ungrateful to this man during his lifetime, she may redeem herself, to some extent, in the eyes of the world, by erecting a monument to his memory. Some time since an attempt was made to secure money by subscription to erect a monument. The State should do it, however, and it is to be hoped that the bill will pass. The discovery of gold here led to such marvelous results to California and to the world, that the man who first found it should at least receive this small recognition from the people among whom he lived.

Senator Walrath has introduced in the Senate a bill to provide for amicable adjustment of troubles between employers and employees through a State Arbitration Commission.

The following is the full text of a very important Assembly joint resolution introduced by Mr. Campbell:

WHEREAS, Under the rulings of the Circuit Court of the United States, as well as the rulings of the Courts of the State of California, the mining industry of our State is in imminent danger of being entirely suppressed; and

Whereas, California is the only State in the Union, or in any other part of the world, in which such rigid judicial decrees have been enforced against the miners as to render mining an outlawed industry and illegal, as mining cannot be carried on without debris; and

Whereas, This industry which has built up an empire on this coast, and upon which such vast interests depend, and upon which the welfare of so many thousands of hard-working people depends, is now in "extremis moris;" and

Whereas, Under the common law of England, in its adaptability to our wants and necessities, and which is the guide of our courts in their decrees against our miners, it is impossible to continue that industry openly and legally without some legislation to protect it; and

Whereas, The miners, as a class, are at present unable to carry on their industry and works without the fear of being enjoined by some judge of some court in our State, which proceeding means eternal ruin; and

Whereas, It is the opinion of this body that some congressional legislation is not only desirable but necessary to protect this industry; therefore, be it

Resolved, That our Senators be instructed and our Members of Congress be requested to take such steps as will, in their judgment, relieve the mining industry of California from its present status, and to that end procure the passage of a resolution of Congress, by which the sum of \$40,000, appropriated by the last session, by false statements, to prosecute the miners, be rescinded, and the unused portion of that money, together with such other sums as can be procured from Congress, be applied to the construction and maintenance of such impounding reservoirs as may be sufficient to retain all mining debris either in the valleys of the streams which have heretofore been used as dumping-places from the mines or elsewhere, and that such money be expended by the U. S. Government Engineers.

The Committee on Mines and Mining have only briefly considered Walrath's bill for impounding mining debris. The bill provides that any number of persons, or corporations, not less than three, who have appropriated, purchased or leased, or may hereafter do so, may form a general incorporation to build dams or works to restrain debris, and have the right to condemn private property for such works as provided by law.

State Engineer Hall has appeared before the Irrigation Committee on Langford's bill abolishing his office. He came prepared with data and maps, showing his plans for irrigation and claiming that the office should not be abolished until his work on the irrigation problem shall be completed. The committee decided to report against Langford's bill and allow Hall one year in which to complete his work.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Con. California and Virginia, Jan. 31, \$74,536, making a total of \$284,595 for January, with one cleanup to come; Bluebird, Jan. 28, \$22,704; Reno Reduction Works, 26, \$3500; Granite Mountain, 26, \$100,000; Marget Ann, 27, \$4000; Moulton, 27, \$17,200; Alice, 27, \$24,192; Hanauer, 25, \$5160; Stormont, 25, \$3050; Hanauer, 26, \$2720; Germania, 26, \$11,990; Bannock, 27, \$3130; Hanauer, 27, \$2640; Germania, 27, \$4085; Hanauer, 28, \$2600; Germania, 28, \$3675; Sprucecroft, 29, \$6500; Hanauer, 29, \$2565; Crescent, 29, \$2980; Germania, 29, \$4067; Hanauer, 30, \$4850; Bluebird, 31, \$23,600. Last week Wells, Fargo & Co. shipped from Salt Lake, \$79,872 in bullion; McCormick & Co., \$28,065; T. R. Jones & Co., \$57,796; Union Bank, \$22,593.

MECHANICS' INSTITUTE.—The Nominating Committee to select the "regular ticket" for the Mechanics' Institute have nominated the following for trustees for the coming year: Columbus Waterhouse, George Spaulding, C. F. Bassett, James Spiers, John Mallon, Irwin C. Stump, and S. J. Hendy.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No. AMT.	LEVISED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Alpha Con M Co.	Nevada.	21.	50.	Jan 12.	Feb 17.	Mar 10.	L Osborn.	379 Montgomery St
Andes S M Co.	Nevada.	31.	25.	Jan 24.	Mar 3.	Mar 23.	B Burris.	303 Montgomery St
Bodie Con M Co.	California.	6.	50.	Jan 24.	Feb 23.	Mar 28.	G W Sessions.	309 Montgomery St
Bullion M Co.	Nevada.	32.	40.	Jan 24.	Mar 1.	Mar 17.	R R Grayson.	327 Pine St
Benton Con M Co.	Nevada.	17.	25.	Jan 24.	Mar 21.	Mar 24.	W H Watson.	302 Montgomery St
Columbia Con M Co.	Nevada.	33.	50.	Dec 22.	Jan 27.	Feb 18.	J M Edgington.	309 California St
Dictator Con M Co.	Nevada.	1.	01.	Dec 15.	Jan 27.	Feb 12.	J F Bolter.	Hawthorne Nev
Excelsior W & M Co.	California.	10.	1.50.	Jan 3.	Feb 3.	Feb 21.	V J Stewart.	215 Sansome St
Four Hills Mine.	California.	1.	25.	Jan 22.	Feb 28.	Mar 21.	F S Moody.	328 Montgomery St
Golden Fleeces Gravel M Co.	California.	8.	10.00.	Jan 27.	Mar 8.	Mar 28.	W J Gleason.	310 Phelan Block
Gold Point M Co.	California.	2.	03.	Dec 22.	Jan 27.	Feb 10.	J M Huntington.	309 California St
Gold Point Con G & S M Co.	California.	13.	01.	Jan 8.	Feb 10.	Feb 26.	A B Brady.	Grass Valley
Hubert Concentrator Co.	California.	1.	10.	Jan 17.	Feb 20.	Mar 14.	M Livingston.	230 Montgomery St
Hazard Gravel M Co.	California.	1.	03.	Jan 26.	Mar 1.	Mar 23.	J T McKeogh.	328 Pine St
Indian Springs Drift M Co.	California.	7.	30.	Dec 30.	Jan 31.	Feb 15.	L H Sharp.	215 Sansome St
Kincaid Flat M Co.	California.	2.	2.00.	Jan 5.	Feb 14.	Mar 7.	W H Keith.	432 California St
Lone Jack M Co.	California.	1.	05.	Jan 27.	Mar 7.	Mar 28.	J M Huntington.	309 California St
Live Oak D G M Co.	California.	4.	10.	Dec 7.	Jan 15.	Feb 5.	T Wetzel.	522 Montgomery St
Lady Washington M Co.	Nevada.	4.	25.	Jan 28.	Mar 7.	Mar 28.	W H Watson.	302 Montgomery St
Madhattan S M Co.	Nevada.	2.	1.00.	Feb 3.	Mar 2.	Mar 22.	J Prockett.	327 Pine St
Maiden C & S M Co.	Nevada.	37.	25.	Dec 16.	Jan 22.	Feb 10.	T W Norwin.	230 Montgomery St
Mexican C & S M Co.	Nevada.	33.	25.	Jan 4.	Feb 9.	Mar 2.	O E Elliot.	309 Montgomery St
Mountain Tunnel G M Co.	California.	3.	15.	Jan 25.	Feb 28.	Mar 1.	A B Paul Jr.	Safe Depts. Building
Mayflower G M Co.	California.	34.	25.	Jan 19.	Feb 28.	Mar 18.	J Moizo.	328 Montgomery St
Norfolk Comstock M Co.	Nevada.	11.	10.	Jan 14.	Feb 14.	Mar 14.	J P Deas.	327 Pine St
North Bell Isle M Co.	Nevada.	11.	50.	Jan 12.	Feb 15.	Mar 9.	J W Pew.	310 Pine St
Nevada Queen M Co.	Nevada.	1.	30.	Jan 11.	Feb 8.	Mar 3.	J H Deas.	309 Montgomery St
Navajo M Co.	Nevada.	16.	25.	Jan 7.	Feb 10.	Mar 3.	J W Pew.	310 Pine St
N Banner Con T Co.	California.	16.	05.	Jan 1.	Feb 5.	Feb 26.	T J Mitchell.	Grass Valley
Northern S M Co.	Nevada.	31.	30.	Jan 21.	Feb 23.	Mar 18.	C E Edwards.	414 California St
Pennsylvania Con M Co.	California.	5.	01.	Jan 4.	Feb 4.	Mar 1.	M Byrne Jr.	Grass Valley
Pneumatic M Co.	California.	2.	20.	Jan 4.	Feb 14.	Mar 8.	H Pichor.	320 Sansome St
Sierra Nevada S M Co.	Nevada.	27.	25.	Jan 4.	Feb 9.	Mar 1.	E L Parker.	309 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE
Gibbs Creek M Co.	Nevada.	W Willis.	309 Montgomery St.	Annual.	Feb 7
Gold Lead & S M Co.	Nevada.	P H Flynn.	425 Montgomery St.	Annual.	Feb 8
Hathaway H G M Co.	Nevada.	J H Moore.	628 Montgomery St.	Annual.	Feb 5
Holmes M Co.	Nevada.	C E Elliot.	309 Montgomery St.	Annual.	Feb 8
Lucky Hill Con M Co.	California.	F D Black.	27 Hills St.	Annual.	Feb 19
Marcus M Co.	California.	W Blundell.	124 California St.	Annual.	Feb 15
Watt Blue Gravel M Co.	California.	G A Benton.	313 Montgomery St.	Annual.	Feb 21

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada.	A W Havens.	309 Montgomery St.	50.	Jan 10
Marion White M Co.	Nevada.	J J Scoville.	309 Montgomery St.	25.	Dec 20
Paradise Valley M Co.	Nevada.	W Lewis Oliver.	328 Montgomery St.	10.	Nov 30
Silver King M Co.	Arizona.	J Nasb.	328 Montgomery St.	25.	Jan 15

Mining Share Market.

The prices of stocks have been rather lower the past week. Quite a number of assessments are being levied just now, to the regret of those holding the stocks. The Virginia Chronicle has this to say of the situation: The weak tone of the market is due in a measure to the management below intimating that there would be only a 50-cent dividend declared by the Con. California and Virginia the current month. The one thing requisite to revive public interest in mining share speculation and cause a marked improvement is an important development in Ophir and substantial proof of the existence of alleged valuable ore deposits in the middle mines by converting it into bullion, which, if the assays range as high as represented, can be accomplished by steam-power and leave a handsome margin for dividends above the cost of production. It is rumored that the Potosi Company is now negotiating for the lease of the California battery mill of 80 stamps, and if successful in securing it, will immediately start it up on ore from the mine.

New York Metal Market.

Telegraphic advices dated Feb. 3d give the following New York prices:

BAR SILVER—\$1.02½ per oz.
BORAX—\$4.64 c.
COPPER LAKE—\$19.00 @ \$11.
IRON—One ton, \$10.00 @ \$19.50.
LEAD—\$4.25.
QUICKSILVER—54 @ 55c.
The following is the latest by mail from the "New York Metal Exchange Market Report":
COPPER—Dull, spot closing at 11.40. Transferable Notices (Lake) issued at 11.25. Transferable Notices (Chili Bars) issued at 1.38 1/16.
LEAD—Quiet at \$4.25 @ 4.40 spot. Transferable Notices issued at \$4.33 1/2.
TIN—Active at \$22.50 @ 22.60. Transferable Notices issued at \$22.60.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.75 @ 22.90; Billiton Tin, \$23.10 @ 23.40; Banca Tin, \$23.15 @ 23.50; Baltimore Copper, \$10.35 @ 10.50; Oxford Copper, \$10.35 @ 10.50; P. S. C. Copper, \$10.35 @ 10.50; Foreign Lead, \$4.75 @ 4.85; Foreign Spelter, \$4.75 @ 4.85.
MAKERS' PRICES—At tidewater, 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$21.00 @ 21.50; No. 2, \$18.50 @ 19.00; Grey Forge, \$17.00 @ 18.00. Hudson River, Grade No. 1, \$20.00 @ 21.00; No. 2, \$18.50 @ 19.00; Grey Forge, \$16.00 @ 16.25. Southern, Grade No. 1, \$19.50 @ 20.50; No. 2, \$18.00 @ 18.50; Grey Forge, \$17.00 @ 17.50.

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, Feb. 3, 1887.	
ANTIMONY—French Star.	94 @
BORAX—San Bernardino.	@ 8
Attagaosa.	@ 23
Eglington, ton.	@ 22
Union Soft, No. 1, ton.	24 @ 25
Oregon Pig, ton.	21 @ 22
Clippage Gap, 1 & 4.	22 @ 23
Clay Lane White.	21 @ 22
Shotts, No. 1.	23 @ 24
COPPER—	
Bolt.	25 @
Sheeting.	12 @ 23
Ingot.	12 @ 13
LEAD—Pig.	4 7/8 @
Bar.	5 25 @ 5 50
Sheet.	8 @
Sheet, discount 10% on 500 bag.	8 @
Euck, 5 bag.	1 85 @
Chilled, do.	2 05 @
QUICKSILVER—By the flask.	38 50 @ 39 50
Flasks, new.	1 05 @
Flasks, old.	1 15 @
STEEL—English, B.	14 @ 15
Black Diamond, ordinary sizes.	10 @
Pow.	4 @ 5
Machinery.	5 @ 6
Sanderson Bros.	10 @ 6
ZINC—German.	8 @ 9
Sheet, 7x3 ft, 7 to 10 lb, less the cask.	61 @
TINPLATE—Coke.	4 90 @ 4 95
Charcoal.	6 25 @ 6 50

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENJOING Jan. 13.	WEEK ENDING Jan. 20.	WEEK ENDING Jan. 27.	WEEK ENDING Feb. 3.
Alpa.	4.25	5.00	3.75	2.25
Alta.	3.15	7.02	3.05	2.20
Andes.	1.75	2.00	1.65	1.25
Argenta.	1.20	2.25	1.20	1.15
Belcher.	4.50	5.00	4.75	4.50
Brophy.	1.00	1.25	1.00	.75
Best & Belcher.	11	13	9	11
Bullion.	3.65	4.00	3.20	2.50
Baltimore.	1.20	1.25	1.00	.80
Belle Isle.	1.40	1.40	1.30	.80
Bodie Con.	3.00	3.25	3.00	2.50
Benton.	1.10	1.20	.85	.75
Bodie Tunnel.	1.75	2.25	1.50	1.10
Bulwer.	1.50	1.75	1.25	1.00
Con. Va. & Cal.	2.25	2.50	2.25	2.00
Challenge.	2.40	2.80	2.00	1.80
Champion.	11	14	9	11
Chollar.	1.10	1.25	1.00	.75
Columbia.	8.50	9.00	8.00	7.00
Con. Imperial.	1.75	2.25	1.50	1.00
Caledonia.	.80	.95	.75	.60
Con. Pacific.	.35	.40	.30	.25
Crown Point.	6.25	7.00	6.00	5.25
Crocker.	1.40	1.40	1.30	1.00
Central.	.55	.60	.50	.45
Dudley.			.25	.25
East B. & B.	2.00		1.70	1.50
Eureka Con.	4.75	5.75	4.00	3.75
Eschsch.	2.40	1.80	2.50	1.50
Grand Prize.		.50		.50
Gould & Curry.	6.75	7.75	6.25	5.25
Hale & Norcross.	5.75	9.75	11.75	5.00
Holmes.	2.45	2.50	2.00	1.80
Independence.				2.60
Iowa.	1.50	1.75	1.50	1.25
Julia.	1.10	1.20	.90	.85
Justice.	2.50	3.00	2.15	1.50
Kenuck.	.70	2.40	.75	.25
Lady Wash.		.80	.70	.60
Martin White.				2.60
Mono.	3.25	3.00	3.30	2.50
Mexican.	7.00	8.00	7.00	6.50
Mt. Diablo.			3.00	3.50
Northern Bull.				7.25
Navajo.	.75	.80	.60	.55
North Belle Isle.	3.25	3.90	3.15	3.50
Niasra.		.50	.45	.40
Ped. Queen.	.75	1.10	1.05	.80
Norb. G. & C.			.65	.50
Occidental.	4.50	5.25	4.00	3.40
Ophir.	124	104	124	124
Overman.	2.15	2.30	2.00	1.75
Potosi.	9.50	8.50	9.25	8.00
Peerless.	.60	.70	.70	.60
Peer.	.55	.75	.60	.40
P. Sheridan.	.40	.45	.40	.35
Silver Star.	9.25	10	8	7.50
Sage.				5.50
Sierra Nevada.	6.75	8.50	6.75	6.00
Silver Hill.	.55	.65	.60	.50
Silver King.	1.50	1.80	1.40	1.10
Scorpion.	1.25	1.30	1.20	1.00
Syndicate.	.25	.30	.25	.20
Union Con.	5.25	6.10	4.90	5.25
Utah.	6.00	7.50	6.00	5.50
Yellow Jacket.	7.00	8.00	6.50	7.75

Sales at San Francisco Stock Exchange.

THURSDAY Feb. 3, 1887.	
1100 Alta.	12 @ 1.80
350 Andes.	85c
790 B. & Belcher.	9 @ 10
1080 Bullion.	2.00 @ 2.10
400 Bodie Con.	1 @ 1.20
450 Baltimore.	60 @ 75c
400 Bulwer.	1.10
450 Belle Isle.	30c
290 Brophy.	1 @ 1.20
150 Chollar.	6 @ 75c
50 Con Va. & Cal.	22 @ 150
470 Crown Point.	4 @ 1135
100 Crocker.	85 @ 90c
170 Challenge.	8 @ 90c
50 Con. Imperial.	1 @ 100
325 Caledonia.	50c
850 Eschsch.	1 @ 45 @ 1.50
70 Eureka.	1 @ 125
125 East B. & B.	1 @ 1700
925 Gould & Curry.	5 @ 54
690 Hale & Nor.	5 @ 64
400 Julia.	50c
250 Lady Wash.	20c
1435 Mexican.	6 @ 64
100 Mono.	2 @ 40
50 N. Belle Isle.	3 @ 75
1400 Nev. Queen.	85c
450 Nevada.	45 @ 55c
200 North G. & C.	50 @ 65c
250 Overman.	1 @ 110
150 Peerless.	1 @ 65c
1135 Potosi.	8 @ 64
100 Sheridan.	1 @ 100
600 Scorpion.	95 @ 100
400 Silver Hill.	30c
400 Sierra Nevada.	4 @ 60
1700 Union Con.	4 @ 44
200 Utah.	6 @ 90

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Golconda Mining Company—Location of principal place of business, San Francisco, California. Location of works, Calico Mining District, San Bernardino County, California.

NOTICE. There is delinquent upon the following described stock, on account of Assessment (No. 2) levied on the 22d day of December, 1886, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificates.	No. Shares.	Amount.
Buffington, J. M., Trustee.....	270	1000	\$30 00
Buffington, J. M., Trustee.....	277	5000	150 00
Buffington, J. M., Trustee.....	275	5000	150 00
Buffington, J. M., Trustee.....	279	1000	30 00
Buffington, J. M., Trustee.....	280	1000	30 00
Buffington, J. M., Trustee.....	286	1000	30 00
Buffington, J. M., Trustee.....	287	1000	30 00
Buffington, J. M., Trustee.....	288	1000	30 00
Buffington, J. M., Trustee.....	289	1000	30 00
Buffington, J. M., Trustee.....	290	1000	30 00
Buffington, J. M., Trustee.....	291	1000	30 00
Buffington, J. M., Trustee.....	292	1000	30 00
Cantrell, T. G., Trustee.....	293	17,000	510 00
Cantrell, T. G., Trustee.....	294	1980	50 40
Cantrell, T. G., Trustee.....	295	1000	30 00
Cantrell, T. G., Trustee.....	296	1000	30 00
Caldwell, Wm., Trustee.....	42	1000	30 00
Caldwell, Wm., Trustee.....	43	1000	30 00
Caldwell, Wm., Trustee.....	44	1000	30 00
Caldwell, Wm., Trustee.....	40	500	15 00
Caldwell, Wm., Trustee.....	176	200	6 00
Caldwell, Wm., Trustee.....	177	100	3 00
Caldwell, Wm., Trustee.....	178	100	3 00
Caldwell, Wm., Trustee.....	179	50	1 50
Caldwell, Wm., Trustee.....	180	25	75
Caldwell, Wm., Trustee.....	181	25	75
Coleman, C.....	192	20	60
Daly, J. J.....	195	480	14 40
Dailey, Mary.....	182	50	1 50
Dailey, Mary.....	183	50	1 50
Dailey, Mary.....	186	400	12 00
Finlay, John.....	205	20	60
Finlay, John.....	206	100	3 00
Green, A. V.....	32	20	60
Hawkins, Mrs. A.....	169	100	3 00
Hawkins, Mrs. A.....	170	100	3 00
Hawkins, Mrs. A.....	171	100	3 00
Hunt, H. S.....	193	25	75
Hunt, H. S.....	190	25	75
Hunt, H. S.....	200	25	75
Hunt, H. S.....	201	25	75
Lloyd, R. H.....	31	20	60
Lloyd, R. H., Trustee.....	36	0030	290 40
Lynch, Annie.....	184	20	60
Lynch, Annie.....	185	80	2 40
Marshutz, R. C., Trustee.....	103	6000	180 00
McKinnon, J. J., Trustee.....	107	5000	150 00
Morehouse, P. F.....	173	500	15 00
Morehouse, P. F.....	174	400	12 00
Morehouse, P. F.....	175	100	3 00
Morehouse, P. F.....	302	1500	45 00
Rikert, A. M.....	7	500	15 00
Rikert, A. M.....	21	20	60
Rikert, A. M.....	25	1000	30 00
Rikert, A. M.....	27	1000	30 00
Rikert, A. M.....	91	100	3 00
Rikert, A. M.....	92	100	3 00
Rikert, A. M.....	102	50	1 50
Rikert, A. M.....	103	50	1 50
Rikert, A. M.....	110	20	60
Rikert, A. M.....	111	20	60
Rikert, A. M.....	113	20	60
Rikert, A. M.....	118	20	60
Rikert, A. M.....	120	20	60
Rikert, A. M.....	121	20	60
Rikert, A. M.....	125	20	60
Rikert, A. M.....	126	20	60
Rikert, A. M.....	135	20	60
Rikert, A. M.....	136	20	60
Rikert, A. M.....	145	10	30
Rikert, A. M.....	147	10	30
Rikert, A. M.....	150	10	30
Rikert, A. M.....	153	10	30
Rikert, A. M.....	154	10	30
Rikert, A. M.....	155	10	30
Rikert, A. M.....	157	10	30
Rikert, A. M.....	160	10	30
Rikert, A. M.....	203	100	3 00
Rikert, A. M.....	210	50	1 50
Rikert, A. M.....	242	100	3 00
Rikert, A. M.....	243	50	1 50
Rikert, A. M.....	244	50	1 50
Rikert, A. M.....	247	100	3 00
Rikert, A. M.....	240	20	60
Rikert, A. M.....	250	20	60
Rikert, A. M.....	251	20	60
Rikert, I. F.....	47	5000	150 00
Rikert, I. F.....	48	5000	150 00
Rikert, I. F.....	49	1000	30 00
Rikert, I. F.....	50	1000	30 00
Rikert, I. F.....	51	500	15 00
Rikert, I. F.....	52	500	15 00
Rikert, I. F.....	53	250	7 50
Rikert, I. F.....	54	250	7 50
Rikert, Annie Kline.....	213	100	3 00
Rikert, Annie Kline.....	214	100	3 00
Rikert, Annie Kline.....	215	100	3 00
Rikert, Annie Kline.....	216	50	1 50
Rikert, Annie Kline.....	217	50	1 50
Rikert, Annie Kline.....	218	20	60
Rikert, Annie Kline.....	219	20	60
Rikert, Annie Kline.....	220	20	60
Rikert, Annie Kline.....	221	20	60
Rikert, Annie Kline.....	222	20	60
Swanton, Mary.....	202	400	12 00
Swanton, Mary.....	203	100	3 00
Townsend, Annie Maud.....	229	800	24 00
Worn, Geo. A.....	224	3000	90 00
Worn, Geo. A.....	225	500	15 00
Worn, Geo. A.....	226	500	15 00
Worn, Geo. A.....	227	500	15 00
Worn, Geo. A.....	228	500	15 00

And in accordance with law, and an order of the Board of Directors, made on the 22d day of December, 1886, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the company, room 4, 300 California Street, San Francisco, California, on Wednesday, the 16th day of February, 1887, at the hour of 2 o'clock p. m., of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of the sale.

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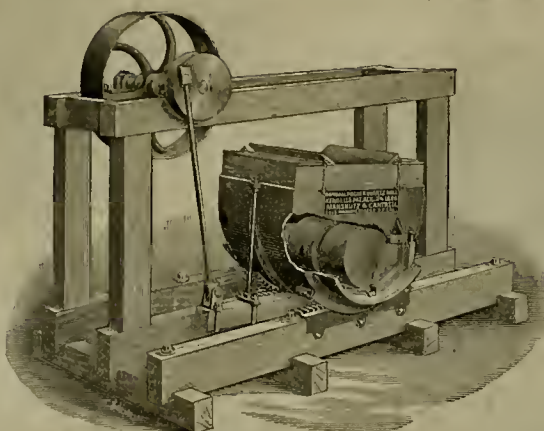
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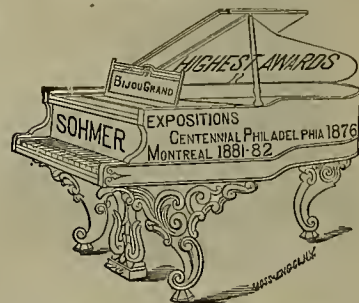
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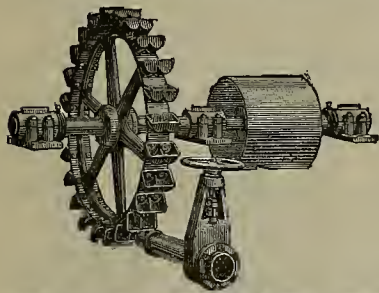
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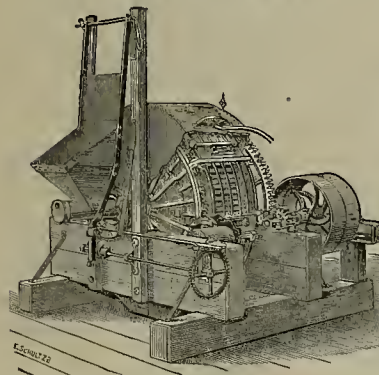
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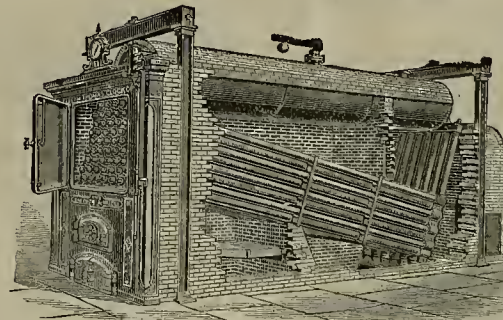
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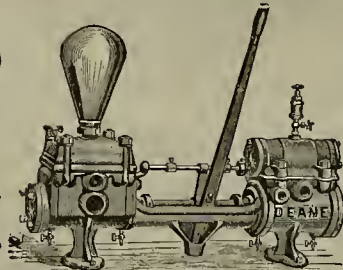
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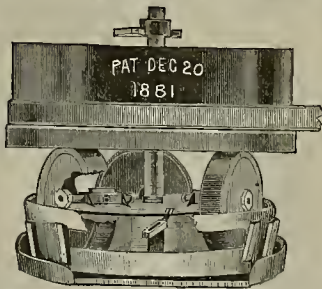
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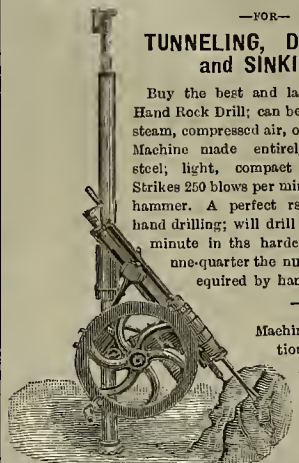
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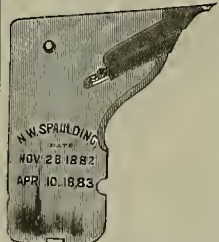
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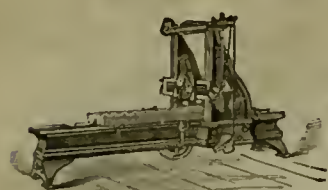
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Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery
ENGINES and BOILERS.

SEND FOR CIRCULARS.

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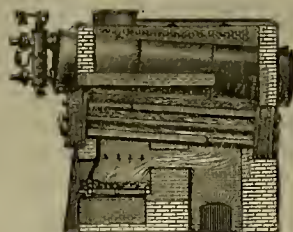
L. R. MEAD, Secretary.

RISDON IRON & LOCOMOTIVE WORKS

Location of Works, S. E. Cor. Beale and Howard Sts., San Francisco.

Manufacturers and Sole Agents for the Pacific Coast for

**HEINE SAFETY
WATER TUBE
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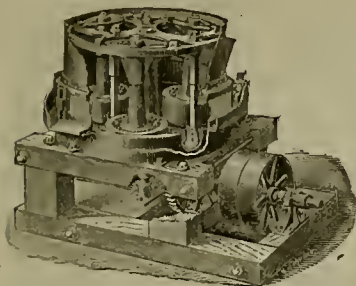


Has the Following Advantages:
**SAFETY,
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ECONOMY,
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60,000 Horse Power now in use.
Boilers can be seen working in San Francisco at Palace Hotel, Spring Valley Water Works,
Huerter Bros. & Co., California Jute Mills, and other places.
Guaranteed More Efficient than any other Boiler made.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.
AIR COMPRESSORS—Hoist Power Transmission,
HYDRAULIC PUMPING and Hoisting Machinery.
WROUGHT-IRON WATER PIPE a Specialty. **NOTE**—Have just completed order for 35 miles of 44-inch
pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.
SAW-MILL MACHINERY of all kinds.
STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.
SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube);
50,000 horse power now in use.
MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-
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REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.
WILSON'S PATENT GAS-PRODUCER.
STEAM BOILERS of all descriptions.
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Pumps, Steam Capstans, Cargo Winches, etc.
Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain
Mining Company.
Send for Circular and Price Lists.



Centrifugal Roller Quartz Mill.

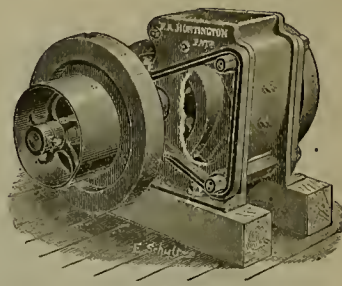
F. A. HUNTINGTON,

MANUFACTURER OF

**Centrifugal Roller Quartz Mills,
CONCENTRATORS AND ORE CRUSHERS,**
Mining Machinery of Every Description,
Steam Engines and Shingle Machines.

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No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



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— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
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AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
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BABY HOISTS,
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STAMPS,
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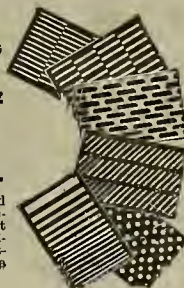
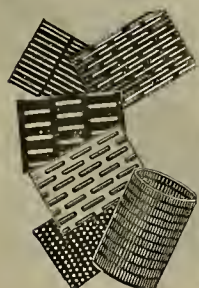
TRY OUR MAKE. CHEAPEST AND BEST IN USE.

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Successors to PRESCOTT, SCOTT & CO.

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Chicago Prices Beaten!
ESTABLISHED 1860.
S. F. PIONEER SCREEN WORKS,
221 & 223 First St., cor. Tehama, S. F.
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Sheet Metals of all kinds perforated for Flour and
Rice Mills, Grain and Malt Driers, Furnaces, Churns, Ce-
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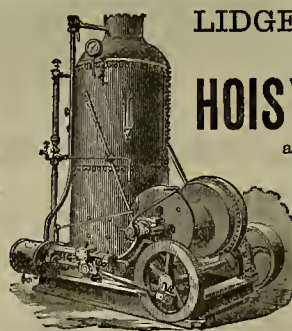
HOISTING ENGINES

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PARKE, LACY & CO., Agents,
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Liberty St.
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CINCINNATI CORRUGATING COMPANY.

JOHN F. HAZEN, Pres't.
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Over 1500 Tons Iron in Stock!

FOUR WIDTHS OF CORRUGATIONS MADE!

STANDING SEAM PLAIN ROOFING!

All Paint Re-ground in Pure Linseed Oil!

THE RUSSELL PROCESS COMP'Y.

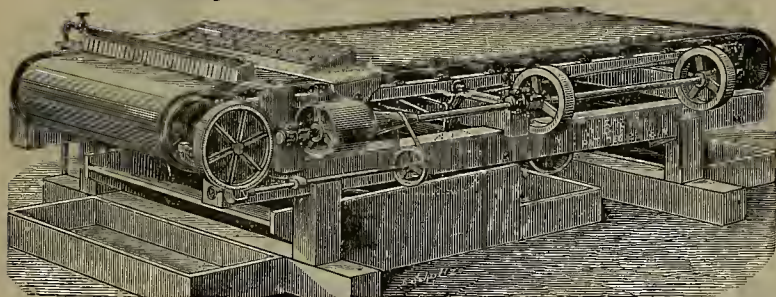
**COAL MINES OF THE WESTERN
COAST.**

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY
Room 709.

A few copies of this work, the only one ever published
treating of Pacific Coast Coal Mining, have been obtained,
and are for sale at this office for \$2.50 per copy. It was
written by W. A. Goodyear, Mining and Civil Engineer,
formerly of the California State Geological Survey.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS
(\$575.00) F. O. B.**

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), London, October 5, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frue and more stamps have been purchased.

ADAMS & CARTER.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

**ADAMS & CARTER, Agents Frue Vanning Machine Co.,
Room 7, No. 109 California Street, SAN FRANCISCO, CAL**



NOTICE TO GOLD MINERS! SILVER-PLATED AMALGAMATED PLATES For SAVING GOLD!

IN QUART GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER
FULL WEIGHT OF SILVER AND BEST QUALITY OF WORK GUARANTEED.

GET OUR PRICES BEFORE ORDERING ELSEWHERE. SAMPLES
FURNISHED ON APPLICATION.

**SAN FRANCISCO NOVELTY AND PLATING WORKS,
No. 108 FIRST STREET.**

NOTICE.—All our plates are guaranteed to have the full weight of silver agreed upon, and are tested before leaving our works, thereby avoiding the complaints about light weight, made so often before we started in this branch of industry.

**JUSTINIAN CAIRE, Agent,
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—DEALER IN—

Assayers' and Mining Material.

—MANUFACTURER OF—

BATTERY SCREENS AND WIRE CLOTH.

Agent for **HOSKINS'**
HYDRO-CARBON ASSAY FURNACES.

JAMES' PATENT RECIPROCATING STAMP MILL

(PATENTED AUG. 16, 1881.)

Weight of Boss and Shoes (1200 pounds) acts on each Shoe separately. It is practically the same as the regular Stamp Mill.

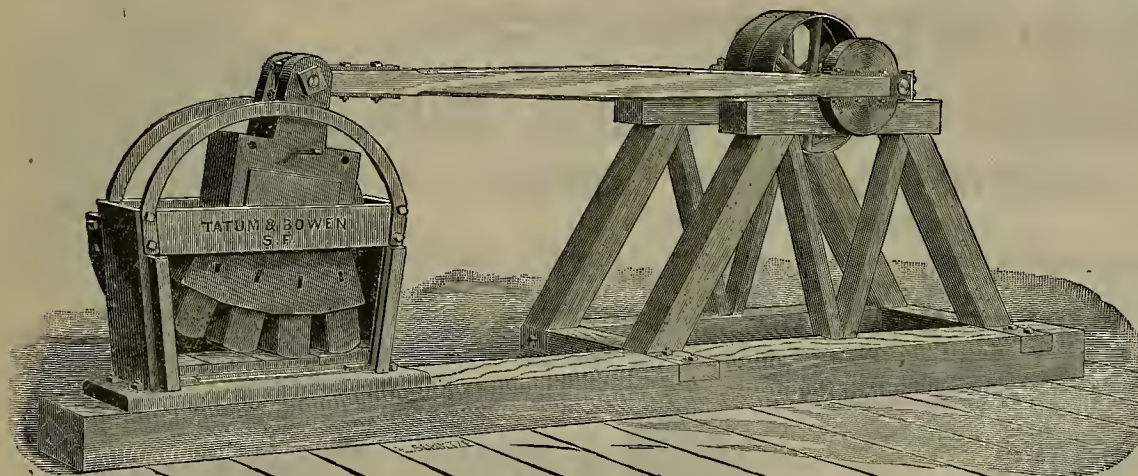
Capacity, 6 Tons in 24 Hours. 4 H. P.

Parties wishing to test the Mill with any ore they may bring, will find one in operation at our works in this city.

PRICES:

Reciprocating Stamp Mill,	\$350 00
Rock Breaker, - - -	100 00
Automatic Ore Feeder, -	50 00
Single Track Ore Car, - -	40 00

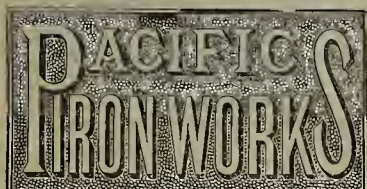
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TATUM & BOWEN,

34 and 36 Fremont Street, SAN FRANCISCO, CAL.

91 and 93 Front Street, PORTLAND, OREGON.



1850. 1885.
RANKIN, BRAYTON & CO.,
...BUILDERS OF...
MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING and REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ore of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ore DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



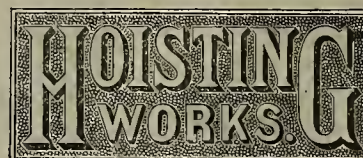
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE of OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machine EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



BAKER'S MINING HORSE POWER.

Fulfilling ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700-pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE of CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, FEBRUARY 12, 1887.

VOLUME LIV.
Number 7.

Saving Floured Quicksilver.

We mentioned recently the experiments made here in the direction of saving floured quicksilver in milling operations, by means of an electrical current, and stated that further experiments on a larger scale were soon to be carried out practically at the Douglas mill, Carson river. Dr. Ras took back to Nevada with him a dynamo for making the working test. From an account in the *Dayton Times* of last Saturday we take the following paragraph concerning the test made:

At 1 o'clock last Thursday, everything being in readiness, the wires were connected with a settler in the Douglas mill at this place, eight feet in diameter and four feet deep, filled with pulp and water, and the machine put in motion, a sample having first been taken from the settler and a like sample from another settler, charged at the same time with the same material. After running one hour both settlers were again sampled and it was found that while the one that was not connected with the electric machine showed no perceptible diminution of floured quicksilver, the one so connected showed a decrease of about 50 per cent. Upon taking samples again at the end of two hours' run, the disconnected settler showed a decrease of 10 to 15 per cent of floured quicksilver, while from that which was being operated upon by the electricity, the quicksilver had almost wholly disappeared. Altogether the test has proved a great success.

Dr. Ras sends us the following additional particulars: "Upon finding that one settler worked so well, the currents were attached at once to two settlers, with even better results. The millman for the trial of the two settlers ran the amalgamating pans ten hours so as to purposely increase the quantity of floured quicksilver. At the third trial of four tons, no floured quicksilver could be seen, and, on examining the sluice-boxes, little if any could be found, while the quicksilver recovered was bright, lively, and healthy."

Since that trial another one has been made, of which Dr. Ras, under date of February 7th, says: "We cleaned up yesterday two more tons, making seven tons, with same result, and have shut down the mill to clean up three pans and three settlers. Tuesday we shall run three settlers with the electric current as against others run in the ordinary way, and have the quicksilver weighed out in each set. We shall run 50 tons and then clean everything up, and weigh back quicksilver and bullion. We had probably 50 visitors Sunday, and all could, and did, see the decrease of floured quicksilver in each successive test. Times of running settlers is reduced one-half. It looks like a splendid success."

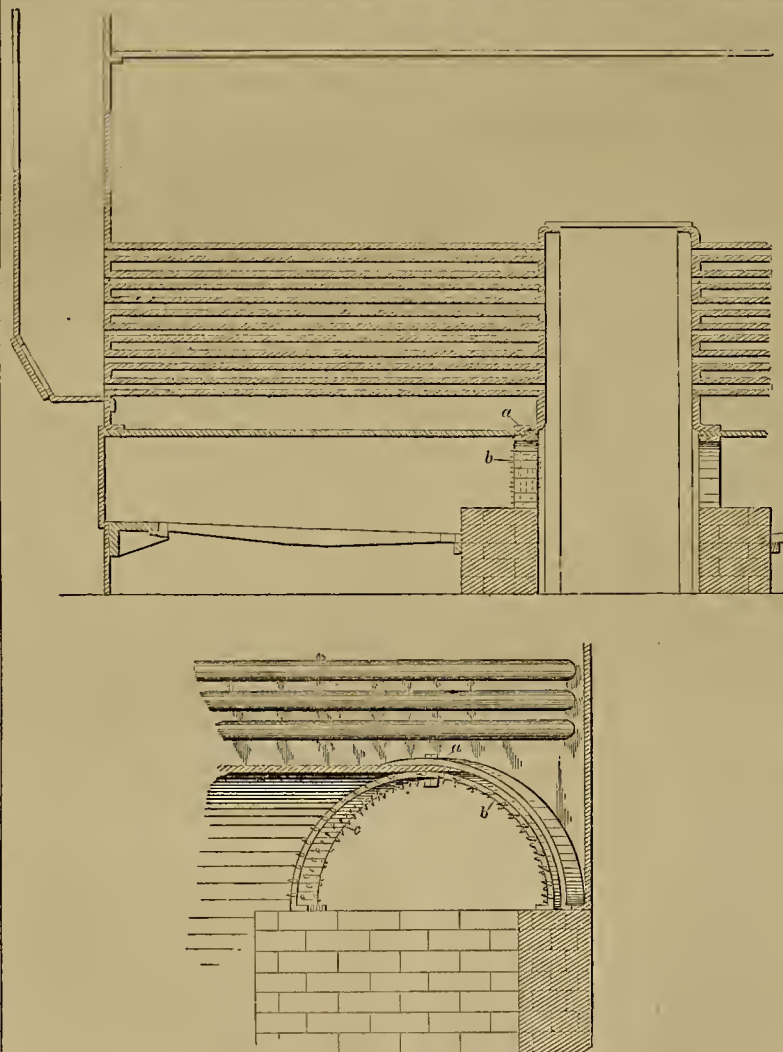
The jury in the now famous McWhorter murder case have returned a verdict of not guilty. McWhorter, of the Marysville *Democrat*, wrote something which gave offense to one Robinson, who is stated to have been an "anti-debris spy," and in a quarrel growing out of this, McWhorter shot and killed Robinson. The case has attracted wide attention by reason of being connected, as above stated, with the mining debris controversy.

The mineral cabinet at the State Library is to be removed to the Crocker Art Gallery in Sacramento. Both the State Mining Bureau and the State University wanted this collection.

The Southern Pacific railroad will run its road through to San Diego from San Juan Capistrano.

A Time and Longitude Indicator.

James H. Culver, of this city, has invented and patented through the MINING AND SCIENTIFIC PRESS Patent Agency a simple device for indicating the relative time and longitude of different places. There are two straight scales, made of wood or other suitable material, one of which has upon it the degrees and divisions of time. It is made with two complete divisions



MADDEN'S SHIELD FOR BOILER FURNACES.

of 360 degrees, the first commencing at the left end with 0 and ending at the center with 360 degrees. The divisions of time commence at the same point at the left end with 12 o'clock midnight, and end with 12 o'clock midnight, 24 hours later, at the center. The degrees commence again at 0 at the center and end with 360 degrees at the right end of the scale, and the time divisions in like manner begin with midnight at the same point and terminate with midnight, 24 hours later, at the right end.

The record, or movable scale, is one-half as long as the first-described one and has the names of places printed upon it at points which indicate their relative longitude, and it will be manifest that by moving this scale over the first one the relative time and longitude may be ascertained the same as with a circular scale.

Selling Stock on Margins.

Though so much has been said for years about the evils of stock gambling, and the danger of poor men dealing in mining stocks, it is nevertheless true that a great many miners all over this coast continue to dabble in stocks. Moreover, most of these transactions are carried out on the "margin" system, by which the buyer only deposits a certain proportion of the value

action was \$348.65, of which Maguire paid the brokers \$100, and they assigned the remainder of the claim to Shain, who brought suit for the recovery. Justice Burke held that the contract between Maguire and the brokers was unconstitutional, and quoted Section 26 of Article IV of the Constitution of California, which he claimed prohibits dealing in stocks on the marginal system. The plaintiff will appeal the case to the Superior Court, on the ground that several New York decisions have held that such sales were valid.

A Shield for Boiler Furnaces.

Wm. Madden, of the Keystons Boiler Works, this city, has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency a shield or protection which is specially useful in connection with boiler furnaces, where great heat is brought upon the angles and flanges of certain portions of the boiler. It consists of a protecting shield for these portions, by which they are relieved from the effects of excessive heat, and leakage, by the constant unequal expansion and contraction, is avoided.

The accompanying engravings show the device. The upper figure is a sectional elevation of a boiler, showing the application of the shield. Below is a perspective view.

In the present case the invention is shown as applied to boilers of that class having large flues in the lower part, with grates upon which the fire is built, bridge-walls at the rear end, and a combustion chamber at the front of the boiler. These boilers are usually made short, and where the high pressure of steam is carried, must be made correspondingly thick and strong.

At the point *a*, the flanges of the inner head or the flue-sheet are turned and riveted to the shell of the furnace, making a lap-joint of considerable thickness, and the exterior of this angle is exposed to the most intense heat from the fire while the interior is in contact with the water of the boiler. The thickness of the metal is such that very unequal expansion takes place at this point, and the result is a strain which causes leakage, so that it is almost impossible to keep the joint tight, and the boilers need constant overhauling and repair on this account. In order to protect this portion from the direct action of the flame and heat of the fires, the inventor forms an arch of fire-clay or brick, as shown at *b*, which extends a short distance each side of the joint and prevents actual contact of the flames with it. This arch may be either built of fire-brick or fire-clay. In the present case, the engravings show a semi-circular iron arch or hoop (having feet or flanges at the bottom, supported upon the bridge-wall at each end, and it is provided with projecting lugs or ridges, *c*, within which the body of fire-clay or the fire-brick may be held and prevented from falling out of place. This prevents the direct action of the heat upon the angle and prevents it from great and unequal expansion, which would otherwise take place, and prevents the strain and consequent leakage at this point.

Active quartz prospecting operations are in progress on Wood's ravine, near Nevada City. The ledges are large, and the crushings give results of from \$9 to \$35 per ton.

of the stock. If the stock goes up he is all right. If it goes down his margin is soon wiped out unless he puts up "more mud," as the slang phrase is. It will therefore interest miners to learn that Justice of the Peace Burke, of this city, has decided in the case of Shain vs. Maguire that the marginal system is unconstitutional. During the recent stock excitement Maguire authorized the stockbrokers, Hadley & Doud, to sell 100 shares of Con. California and Virginia on margins, and agreed to furnish the certificate at a future date. The stock was sold as directed, but Maguire afterward refused to deliver the certificates and the brokers were obliged to purchase 100 shares of the stock at the advanced price of \$757.50, sold in order to fulfill the terms of their contracts with the buyers. The difference resulting from this trans-

The Reno Reduction Works.

So quietly and unostentatiously has the work of construction been prosecuted since the formation of a company to build reduction works in Reno, says the *Gazette*, that very few people understand the real size and importance of the institution. To-day, however, after a very few months' time has elapsed, the ore is actually being worked, and the shining silver is being shipped away. One remarkable

Feature of the Works

Is that not a plan has been drawn on paper and not a stake has been stuck by a surveyor. A preliminary line was run by Mr. Bridges to establish the amount of fall that could be obtained, but after that the only chart to work by was in Mr. Howell's head. He marked the places for the wheel, the tail-race, the building, furnaces and battery, with all the shafts, pulleys, heling end everything, and not one was moved a quarter of an inch from the mark, and everything works smoothly and correctly without a jar or creak. No less remarkable is the fact that Mr. Howell's estimates of total cost have come out exactly. He has put in ten stamps instead of five, and four pans instead of two, and the whole outlay is just \$1500 more than he asked for in the first place. It is difficult to describe the workings of large and complicated machinery, but enough can be said to show even the layman the *modus operandi* of divorcing the precious metals from the dull company it has kept so long. The ore is carried to the doors on the north side of the building in cars on a side-track built from the Central Pacific road. This brings them on a level with the floor of the ore-room, 30x100 feet, over which there is a strong loft and below which two stories of the works stand on benches toward the river. On the ore-floor the rock is thrown into the breaker, from which a bucket elevator carries it up to the loft. It is then sampled and the sample goes back to the ore-room, and through a small rock-breaker and into a grinder, after which it is taken to

The Assay Office.

Here, Mr. Cerey, who has been associated with Mr. Howell for many years, is considered to be more directly in charge. He has the furnace and scales in a small wooden building apart from the main works, where the book-keeping is also done. The main body of ore, after the sample has been obtained, is dropped from the upper ore-loft into a self-feeding hopper above the battery. Here it is crushed by the ten stamps working on the dry process, and is carried along to the elevator, which raises it to the self-feeding bin, over a 60 inch Howell telescope-cylinder furnace, which is the largest size made.

The Furnace.

This furnace is, next to the battery, the most striking feature of the works. It is a huge iron cylinder, the upper end of which enters a brick flue and the lower a great brick fire-box.

The vast iron cylinder rests in drivers turned by machinery that keeps it revolving at the rate of eight revolutions a minute. The cylinder is slightly lowered at the big end, so that as it turns slowly around, the powdered ore works along toward the dumping place and is released by the dropping of two iron folding doors, operated by chain gear, into an iron car which is run out on a track and carried by a derrick to be emptied on the ore pile to cool. All this is on the middle bench which forms the second story, the ore floor being the upper one, this the second and the pen-room the lower one. An iron door can be raised on the side of the furnace right over the fire so one can look right through the cylinder and see the fine particles carried up the sides of the slowly turning cylinder and dropping in a constant shower of red-hot snow through the intense heat that passes from the furnace through its whole length and out into the flue at the other end. The cylinder has a capacity of at least 30 tons in 24 hours, and is able to do double the work of a 10-stamp mill. There is about 300 pounds in at any one time, and it is exposed for 45 minutes in passing. The feed can be changed so it will be a longer or shorter time, and the different kinds can be mixed to suit each other. The Howell furnace has been in use for 10 years and is an invention of the president of these works. Nothing compares with it as a chloridizer and oxidizer. It does the work of 10 stamps with two cords of wood and one man's time. It is also used as a dryer to take the moisture from the ore before it goes to the stamps.

The Fumes from the Furnace

Pass out into a brick-dust vault outside the building, which is divided into five chambers. It stretched out they would be 80 feet long. The vault is a solid brick structure 60x20 feet, with iron side-doors through which the accumulations are removed. The fumes from the high stack over the dust chamber have been largely relieved of their load in passing, but still contain antimony, sulphur and zinc. The thick, white smoke is the heaviest in sulphur. The roasted ore goes into the pans on the same floor and thence to two settlers on the next floor below. Here there is an engine and hoiler, pumps, the retorts, etc. The 30-ton water-jacket furnace and Baker blower are being erected on this floor, and in time

A Copper Smelter

Will be set up alongside of it. About 550 bushels of charcoal will be used every 24 hours unless it is found to be too light. If it is, it

will be mixed with coke. The company is impounding the tailings, so that the river is hardly stained. The wires for the electric light are strung, and the same wheel will give power to the dynamo that runs the works. This is a 50-inch Leffell double turbine wheel made in Springfield, Ohio, which Mr. Howell thinks is undoubtedly the best wheel made for heavy work. It is being caged in heavy wire to keep out float ice. The 112-horse power comes from the river through a ditch 900 feet long, with a dam 110 feet long and six feet high. It can be raised a foot and the whole river turned in and the power quadrupled. It speaks volumes for the future to see such a splendid power obtained by a ditch only 900 feet long. It will, in time, line the Truckee with factories and make a great manufacturing city here. It is cheaper, safer and swifter than even natural gas.

The Ore is Being Worked

In an entirely satisfactory manner. It is coming in double the quantity that any one expected, and will continue to increase as fast as the works can handle it.

Virginia City has a great deal of base ore which will come here. Mr. Howell could get a good deal of ore to mill if he had more stamps. At \$6 a ton, the price paid on the Carson river, it would pay well. It would be necessary to name almost every town on the C. & C. and most of those on the C. P. as far as Elko, besides Eureka and Austin on the east, Grass Valley and Ophir on the west and Cedarville and Cottonwood on the north, to tell where the ore is coming from. The company has got out a

Schedule of Rates

Which is as follows: For milling ores they pay 90 per cent of the gold and silver in ores assaying 300 ounces and under.

For ores assaying from 300 to 500 ounces per ton 93 per cent, and ores assaying 500 ounces and upward 95 per cent.

Milling charges \$14 per ton. Silver at the current rate of discount.

For smelting ores they pay 90 per cent of the gold, silver and lead on ores carrying 50 per cent lead and under, and charge \$14 per ton for reduction.

For ores carrying over 50 per cent lead, they pay the same percentages of gold, silver and lead as above, and charge \$10 per ton for working. For large lots still lower rates will be made.

Ores sampled and paid for as soon as received, and sacks returned to the shipper. There is no charge for sampling and assaying. Railroad rates from any point are furnished on application, and are very low.

The next thing needed is more stamps for free-milling ores and well-equipped refining works to separate the silver, gold and lead. The capital might easily be increased to \$100,000 right away and may be twice that in a few years. In time, chemical works to save the zinc, sulphuric acid, etc., will pay.

The Bounty for Mines.

Williamson's bill to encourage prospecting and develop the mineral resources of the State of Nevada has caused considerable discussion. Following summary of the arguments, for and against, is taken from the *Austin Reveille*:

"Those who argue against it, claim that the State finances could not stand the drain which would result from the Act; that the corporations or large mine-owners would reap the benefit, and that it gives too much sway to the practices of fraud which would result from the remoteness of many ledges from settled districts. That it would benefit only the rich districts, as \$100 per ton is rich rock and is found in comparatively few sections of the State. That the low-grade ore would receive no encouragement. The prospector who gets ten tons which assays \$100 a ton does not need the \$500. Those who favor it, claim that it will encourage prospecting and will lead to the discovery of rich finds, which will in the end overbalance the expenditures of the State, in that the new mines increase the taxable property and add more revenue to the State. Property all around the new discoveries becomes more valuable, and as the nation protects the manufacturing industries in order to foster them, why not encourage the poor prospector in his search for hidden wealth? He has to find new ledges that have not been worked or located, to sink over 50 feet and get out ten tons of rock which will assay \$100 per ton. This will prevent the working of barren ledges for the bounty, and will insure the opening of good ledges. The \$500 will no more than pay the expenses while searching for the ledge, and the property in some cases will become valuable enough, in which event taxes will come to the State which will more than repay the outlay. We would like to see encouragement given to the prospector, but the bill should be explicit so that frauds cannot creep in and destroy the intention of the measure."

THE Union Pacific system's pay-roll includes 20,000 persons. The payment of actual money to employees has now entirely ceased, a system of check payments being substituted. This does away with the handling of money and attendant risk, and the ticket offices at the different stations are made banks where these checks are cashed. The indorsed and canceled checks are then returned to Omaha as vouchers or receipts. If any agent cannot meet the demand, he telegraphs to the nearest station for funds.

La Mina Cordovena.

San Francisco Capital in Mexico.

The superintendent of the company gives the history and description of La Mina Cordovena, situated near Santa Ana, Sonora, Mexico, in the following language:

Some years ago, a Spanish adventurer from the city of Cordova, having read some old works written by the Jesuit Padra describing the mineral wealth and beautiful climate of Mexico, concluded to improve his fortune, and embarked for the land of his dreams. Landing on the western coast of Mexico, he heard of the then famous mine La Pima, whose riches, although worked in a crude way, yielded an amplitude to a large number of natives. Not finding room for speculation here, he studied the situation, sharp and shrewd as he was, and concluded to have a mine of his own. He here happened to fall in with one Pasqual, an Italian fugitive, having a similar object in view; the two set out, following up mineral deposits in search of another Pima. After many hardships and disappointments they found in the craggy and broken ridges of the Pima mountains, the croppings of an apparently rich vein of silver ore. During the subsequent work of exploring the vein, the two disagreed and separated, the Cordovenean, as he was called, keeping possession of the mine; he continued to work and soon had hullion.

About this time the Mexican mining laws, regarding the working of mines, right of possession, etc., were changed, the Government taxing all mines then worked, and making large concessions to capitalists as an inducement to open up the country. This proved too much for the indolent and unskilled natives, who so far had worked the mines in their own way. Many mines were abandoned, or were sold to foreigners, who up to this time could not own them, except in company with a Mexican citizen. The Cordovenean, about this time, went to Hermosillo to dispose of some silver hullion, and, it is said, died there.

A mercantile firm of Benson, A. T., having known of this mine, became its possessors. The new owners went to work sinking a regular working shaft, and intended to open up the mine in good shape. During this time the Sonora railroad was being built, and this firm, holding large contracts, lost heavily and failed. One Mr. Bennet, an employee of the aforementioned firm, became possessor of the mine. He continued the work of developing the mine, and went to San Francisco to put it on the market; he here met H. D. Bacon, a millionaire, who had come into possession of the Pima mine. Pooling their interests, they soon found a company ready to purchase the two mines; an offer of \$200,000 was rejected by Bacon. Bennet held on but a short time, his means being exhausted, the property went out of his hands, and has now by purchase become the property of the present owners, who thus fall heir to a considerable amount of good work done by its former owners in developing the mine. During the past year they have employed a heavy force of miners and spent a large sum of money, and the works are now in such shape as to make the Cordovena the most promising and largest mine in Northern Mexico.

La Mina Cordovena is located ten miles west of Santa Ana station, on the Sonora railroad, Sonora, Mexico, being about 70 miles south of Nogales, the border city of Arizona Territory. It is conveniently reached from the station in two hours by a good wagon road. The mine lies on an elevation of about 200 feet above the surrounding plains in the Pima mountains. An abundance of water for all working purposes is to be had at the foot of the mountains, and a large belt of timber, of dense and heavy growth, in close proximity to the mine, furnishes fuel for all time.

The formation of the ridge, on which this mine is situated and running parallel with it, having a direction from northeast to southwest, is of the most desirable character of formation for mineral, being partly amorphous limestone, as hanging-wall, and having slate as footwall, forming therefore a regular contact, between which the ledge or vein is bedded. The limestone hanging-wall is solid and compact, in taking out the ore very little timber is therefore necessary; this alone forms an item of no little importance when economical and cheap mining is considered. The ledge is well defined from about 40 feet below the surface to the present depth of 235 feet; above 40 feet, and up to the surface, it is somewhat broken up and twisted, owing to former volcanic disturbances.

A large California whim with steel wire rope and iron buckets are the present means of hoisting the ore to the surface, where it is dumped into carts, ready to go to the mill for reduction.

Development of the Mine.

The works of the mine consist chiefly of one vertical shaft 8x8 and 115 feet deep, being sunk on the ledge for about 30 feet (which has a dip to the southeast of an angle of 50 degrees), the remainder of the shaft was then cut through the footwall, or slate; at a depth of 75 feet, a rich body of ore was encountered, coming in from the southwest; examination proved a smaller vein, or stringer, coming in from above, at an angle of 70 degrees, and uniting with the main ledge, or ore body. At the bottom of this shaft a station was constructed and another shaft or incline sunk to the further depth of 100 feet, making the total depth of the main shaft 215 feet. From this level a crosscut was now

run toward the ledge, striking the same at a depth of 235 feet from the surface, and showing the ledge here in the strongest and most desirable shape, the ore as good, if not better, than in any part of the mine.

One hundred feet above this, the present lowest level, another crosscut was run to the south-east, striking the ledge at a distance of 30 feet from the shaft, and the crosscut carried clear through the ledge to the hanging-wall. The ledge shows a width of 20 feet between walls. The principal characteristics of the ore are chlorides, black metal or sulphates of silver, silver glance and horn silver, all being free milling, which was proved by practical milling tests of two months' duration.

The ore in this crosscut, being sampled, showed a surprisingly large result; the lowest average of the whole ledge assayed 21 ounces of silver to the ton, while about 5 feet in the center of the ledge assayed 55 ounces per ton on the average; a drift of 50 feet on the ledge to the southwest showed the ore to be the same all the way as encountered in the crosscut.

Seventy-five feet above this level, or 40 feet below the surface, the ledge was crosscut once more, showing a width to the hanging-wall of 12 feet, and being all ore.

From this point a winze has been sunk on the ore to connect with the 115-foot level, for the purpose of ventilation, and opening up a large body of ore ready for stoping.

The Cordovena mine is 2625 feet in length and 655 feet in width, comprising an area of 40 acres. Beginning at the northeast boundary the croppings of the ore body can now be easily traced for about 2000 feet; numerous small shafts and cuts show a very uniform character of the ore body, the same as shaft No. 1. Toward the southwestern boundary of the mine the ore carries some gold with the silver, and a small show of galena; the latter, however, in so small a percentage as to be no detriment to free milling and amalgamation.

Old Placer Mines.

It is constantly reported that abandoned mines in different portions of the State, which were worked in early days, upon being reopened are yielding handsome profits. Tuolumne county was noted in early times for the richness of its placer mines. Many of them were worked in a manner to get the quickest returns at the least expense, and when failing to pay without increased labor, shafts and tunnels were abandoned and allowed to fall in and fill up. Among these old mines no doubt there are some of them that still contain handsome fortunes. Take for instance Table Mountain near Shaw's flat. Reed, Krytser, Russell, Eakin, Caldwell and others, took out of a river-bed gold enough to make them all rich. Yet there is not one of them that believes they secured near all that the river-bed held. As was expressed, they just scratched the old bed above the drop-off. They worked with many difficulties hundreds of feet under ground, contending with water without the improved facilities of later days. It was demonstrated that the old river-bed, hurried deep under the mountain, was vastly rich for a distance from where it was explored until reaching a drop-off below.

With the knowledge of the times in which it was worked and the appliances at hand, it is certain that the gold deposits were not nearly worked out. If parties with capital will open up this old work again, it promises as favorably as any mining operation that has yet been worked in the county. There are other old mines to which attention can be called that will some time be worked and yield handsome returns. Capital is required to re-enter these old works. The placer miner of to-day is not fixed in that regard, hence he does not seek for them. There are quantities of old ground in Tuolumne that will yet pay largely and prove that the mines are not all worked out.—*Tuolumne Independent*.

UTAH SALT.—The Salt Lake *Democrat* says: Amid all the demoralizing influences at work in these "Valleys of the Mountains," Utah salt has not, in scripture language, lost its savor. There is salt enough in this Territory to preserve and put in pickle the Old and New World. On the shores of Salt Lake, storm and sunshine have deposited vast fields and deposits of the saving mineral. In Southern Utah, huge ledges of crystal salt, mixed more or less with earthy matter, are to be found, from which the quartz mills of Pioche were supplied in the palmy days of that mining camp. Large shipments are at present made to the mills of this and adjoining Territories from Salt Lake deposits. The supply will continue so long as the world stands. The present annual income from the sale of salt is about \$75,000.

BULLION AND BORAX PRODUCT.—Following is the total bullion and borax product of Esmeralda county, Nev., for 12 months commencing October 1, 1885, and ending September 30, 1886: Ores—34,773 tons and 1583 pounds, the gross yield of value of which was \$721,661.54, and net yield on which taxes were paid was \$107,970.26. Borax—Amount worked, 10,369 tons and 484 pounds, the gross yield or value of which was \$109,436.77, and the net yield, on which taxes were levied, was \$10,180.59. It is safe to say that this does not contain all that was produced, but simply what was returned to the assessor.

Impounding Mining Debris.

Following is the full text of the bill introduced in the State Senate by Mr. Walrath, of Nevada county:

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Any number of persons or corporations, not less than three, having appropriated, purchased or leased, or who may hereafter appropriate, purchase or lease, water for mining purposes, may form a corporation, under the general laws of this State, to build dams and other works, to restrain and impound mining debris carried into or down any stream by the water appropriated by them. Places for the deposit of such debris, and for dams and other works for impounding the same, are a public use, and may be condemned and taken by such corporation, in the mode provided by law for taking private property for public use.

SEC. 2. When corporations join in the formation of a corporation under this Act, they shall act through their president, duly authorized by the directors or trustees, with the consent of at least two-thirds of the stockholders, and in addition to the articles of incorporation now prescribed by law, each subscriber to such "articles" shall give a description of the water rights and ditch property owned by him, or the corporation which he represents, and all subsequent subscribers shall give a like description of the ditch and water property they represent, and such a description shall be duly recorded in the office of the county recorder, in the county in which the property is situated, and such record shall be notice to all the world of the liens and rights of the corporation, and the creditors thereof, as hereinbefore provided. Any person or corporation who shall hereafter appropriate or use water for mining purposes, subsequent to the formation of any corporation contemplated by this Act, shall have the right to subscribe to its capital stock upon the same basis and conditions as the original subscribers, and the liability of such description.

SEC. 3. The number of shares of stock in such corporation shall be equal to the estimated number of miner's inches, or other units of measurements, of the water which will probably be discharged from the mines into the stream above the point where the proposed impounding works are to be erected. Each subscriber of stock in the corporation shall take such number of shares of stock as the number of inches, or units of measurement of water appropriated by him, or the corporation he represents, to be used above the impounding works, bears to the whole capital stock of the corporation.

SEC. 4. All property, a description of which shall have been recorded, as herein required, shall be and remain subject to the payment of the debts of the corporation; and no conveyance or lien upon such property shall have priority or shall deprive the corporation, or the creditors thereof, from proceeding against such property, by a joint or several proceeding, after either personal service on the owners of the same, or publication of summons, as required in cases of non-resident defendants, at the option of the plaintiff.

SEC. 5. Any corporation formed under this Act shall have power to levy and collect such assessments from time to time, upon its subscribed stock, as may be necessary to construct and maintain restraining dams and other works necessary or proper to restrain all mining debris on the streams designated in the articles of incorporation above such dams, and other necessary expenditures, which assessment shall be a lien on the property described by each stockholder; and the corporation may collect such assessments, either by an action against the delinquent stockholder for a personal judgment or by foreclosure of the lien herein provided for, and for judgment for any deficiency that shall remain after the sale, under the judgment foreclosing such lien. Ten per cent of all assessments levied and collected by such corporation shall be paid into the treasury of the State, and shall be invested from time to time in such State and Government bonds of the United States as the Governor may direct, to constitute a sinking fund to keep and maintain the dams and works connected therewith, of the corporation, in good order, in case the corporation should become bankrupt, or the property of the subscribers should become exhausted. Whenever it shall become necessary to use such sinking fund, or any part thereof, to maintain such dams and works, the Legislature shall have power to pass all the necessary laws for that purpose.

SEC. 6. Any corporation created under this Act shall be liable for all injuries resulting to any person by reason of insufficiency of dams, or other works, to restrain all mining debris not carried in suspension by the water, or for the damage occasioned by the breakage of such dams or works, by reason of insufficient construction or maintenance.

This Act shall take effect on and after its passage.

THE RIGHT WAY.—Like many other mining excitements, this district is not without a number of prospect-owners who run away with the idea that they have another Hildreth, McNally or Golconda mine, and consequently place a false value upon their property that mining capitalists can't touch with a 40-foot pole. Such men, when they awake from their dreams, will see the fallacy of this course, and will readily speculate upon croppings that assay

\$50 per ton free gold, and purchase such locations say at from \$300 to \$800. If they would then do development work, as other mining men in the district have done, they would stand fair chances of success, and this would be much better than have prospectors do the work for them, and by this means fictitious prices would in a measure be avoided. There are quite a number of opportunities at present for mining men to get lay-outs on paying ledges (croppings) that would justify them in spending a few hundred dollars, or enough to satisfy them of the value and extent of the ledge.—*Fine Gold Miner, Fresno Co.*

The Black Range Mines, N. M.

Some of the mine-owners of this portion of the Black range who have let their properties remain idle, awaiting the starting up of the lixiviation works, had better hestir themselves in order to be in readiness for the mill. Work at the mill is steadily progressing, and its completion is not far distant. The engine has been repaired; now shells have been put on the Cornish rolls; all the leaching, precipitating, and storage tubs are about ready for setting up; all the old machinery that is to be used has been put in order; the foundation of the cooling floor is completed; the excavation for the foundation of the chloridizer, and furnaces are ready for the foundations, and in fact, nearly everything is in readiness for the new machinery, some of which will arrive in a few days. Almost ever since the foundation of the camp, the cry has been: "If we only had a mill to treat our ore we would develop our mines!" There is no question but that we will soon have a mill that will successfully treat the ore of the camp, and the miners should see that the mill is sufficiently supplied with ore to keep it in constant operation. There is no other mining district in any mining country that possesses a quality of ore better adapted to the process of lixiviation than ours, and there is no reason why we should not be counted as one of the main producing camps of the Southwest before the close of the present year. Do not conceive the idea that undeveloped properties will be in demand at fabulous prices, because there are prospects of liveliertimes; mines that bring high prices nowadays must be developed, and now is the time to develop them. The opening up of our mines means business, prosperity, plenty of money, and a railroad. We have a sufficient amount of ore to bring all these things about, were it but taken in hand and properly handled.—*Black Range.*

A CHARCOAL MONOPOLY.—A monopoly of the charcoal business is threatened in this city, and dealers and trades-people using the fuel are somewhat anxious. About 200,000 sacks are used annually in San Francisco by tinmiths, metal-roofers, assayers, jewelers and tailors, the Mint and Chinese laundries and restaurant proprietors. Charcoal costs at present 40 cents, against \$1.50 in past years, per sack of 50 or 65 pounds. Lately the charcoal burners have migrated to the southern forests, and it is a combination between the dealers and burners that is now feared. The men work on shares and in gangs of six or eight. It is thought that some of the Italian charcoal burners will refuse to sign the compact already drawn, making one San Francisco dealer a charcoal monopolist, but the dealers do not propose to take chances, and one is now inspecting woods in various parts of the State, preparatory to engaging men of his own to manufacture charcoal.

FINE COPPER.—A Mr. Clark arrived from Ensenada yesterday, bringing with him some samples of copper ore taken from a mine a few miles below Ensenada, Lower California. The specimens were taken to W. F. McNamara's office for assaying. Only a rough attempt has as yet been made to find the value of the ore, but Mr. McNamara is confident that at the least calculation it will run 50 per cent copper, also carrying some silver. Mr. Clark reports that the mine is easily accessible, and that the ledge is fully eight and a half feet wide. Without having had an assay made, the owners are so confident of the value of the mineral that they are now working two shifts of men. A large Chicago corporation owns a mine near the one from which the samples were taken, and they expect soon to commence operations.—*San Diego Union.*

CARRYING WATER.—Mr. Harris has introduced an ancient Mexican method of transporting water. He has to go three miles for it, and he uses an immense canvas vessel which he throws over his horse's back and carries 35 or 40 gallons at a time. It is three or four feet long and hangs down on each side so as to nearly cover the horse. An opening at the top admits the water and a strap in front and one behind keeps it in place, although it is so heavy that nothing could get it off even when not fastened. The water is drawn off through a hole in the lower corner on each side, stopped by a cow's horn. To open it the horn is pushed back, and when allowed to drop, the water behind pushes it tightly into place and stops the hole entirely.—*Reno Gazette.*

LOBSTERS.—J. D. Redding, Pacific Coast agent of the United States Fish Commission, has been notified that the consignment of lobsters which has been expected for some time will not reach this coast until some time in April or May.

Prison Labor.

The report of the Senate Committee on State Prison and Prison Buildings is one of the most interesting and elaborate documents yet presented. Regarding the abolition of remuneration to convict laborers, the committee say:

We commend the action of the Board of Directors in abolishing the system of remunerating prisoners for their labor at a per diem, and in place thereof substituting a system of rewarding meritorious labor only, by requisitions on the Commissary for certain comforts or materials in addition to those usually allowed; and we recommend a distinct Act, or resolution, forbidding the payment by the officials of a per diem compensation to prisoners for labor. We further doubt the legal rights of the board to allow such compensation.

The door and sash department is commented upon as follows:

The door and sash department has proved to be the most profitable industry in operation at the prison to the State, the net earnings for the 37th fiscal year being the sum of \$23,391.48. The building occupied by the department, in conjunction with the furniture department, cost the sum of \$200,000, and the number of convicts detailed for labor in the department is 160. The machinery in use is owned by the California Door Company. From examination and the clear and explicit explanations of Mr. Ranson, superintendent of the department, the following facts have been ascertained, which are of value in the present consideration of the question of the conflict of prison labor with the interests of free labor, so far as the San Quentin prison is concerned, this being the only department in the prison causing any discussion of moment on that subject. If it is decided to abolish the department, the California Door Company will undoubtedly remove its machinery elsewhere, and employment be given to about 100 free laborers, viz., boys, skilled mechanics, or Chinese, as the company may select, the amount of whose wages would be the sum of \$50,000 per annum, the estimate being that 100 free men will accomplish as much work as the 160 convicts. The price of manufactured articles in this State would not be affected. Hence the consequent advantage to the laboring classes would be the distribution of \$50,000 per annum in wages. The loss to the State would be annual earnings, \$23,391.48, and convicts to the number of 160 thrown out of employment, unless other plans be adopted, as herein suggested, relating to the jute department, and the sum of \$160,000 appropriated therefor. Also the building, valued at \$200,000, would be useless, unless converted into a reformatory or used as a spinning and weaving department for jute manufactory; in either event a sum of not less than \$25,000 would be required to remodel the building. It is with great reluctance that your committee approaches this question, because we find ourselves confronted with two serious propositions; the first being a financial injury to the State of California, by cutting off a source of revenues, and rendering valuable property useless. The second being the declaration of principles opposed to convict labor as enumerated in the platforms of the great political parties of this State, upon which the present members of the Legislature were elected, and which are presumed to be the sentiments of the people of this State. Your committee is divided in opinion on this subject, the opinion of the majority being given in subdivision eight of this report.

The majority of your committee are in favor of maintaining the sash and door department as it now is, for the time being, and for the reason that arbitrary and sudden action in the matter would result in injury to one body of citizens, which would not be compensated by sufficient immediate benefits to any other body. In other words, the financial loss to the State, which must be met by additional taxation, would impose a general hardship which the benefits to be derived from the distribution of a portion only of the sum of \$50,000 per annum to free white labor would not justify in the present condition of affairs. The change can be made, however, gradually, harmoniously, and we trust that more light may be thrown on the subject, that such action may be taken, ways and means devised to accomplish the desired object in due time, after the immediate and pressing necessities of the prison are considered, and in accord with the interests of all concerned. Seven of your committee agree in the above report; two, Messrs. Murphy and Lenahan, being unavoidably absent on other committee work, have not expressed an opinion.

MINING TAX.—According to State Controller Halleck's report for the fiscal year ending Dec. 31, 1886, the gross yield of gold and silver mines of Nevada for the 12 months commencing Oct. 1, 1885, and ending Sept. 30, 1886, was \$6,375,715.82, of which Storey county produced \$2,997,881.84. The State and county tax on the net proceeds of the mines aggregated \$15,491.51, of which Storey county paid \$2468.56.

COLORADO MINING LAW.—In Colorado the State law requires that a locator of mineral land shall, within 30 days after location, do development work to the amount of \$100. If this work is not done, the claim is subject to relocation by other parties. As a consequence, in Colorado all mining locations are worked from the date of location, and no one man holds a lot of unworked claims.

Mining and Scientific Press.

The MINING AND SCIENTIFIC PRESS, published in San Francisco, in its last issue has a valuable and exhaustive article entitled "Mining Review for 1886."—*Foothill Tidings, Nevada Co., Cal.*

The MINING AND SCIENTIFIC PRESS, San Francisco, one of the most reliable mining and milling journals published in the interests of milling and mining, in its issue of Jan. 22d contains a lengthy article illustrating the leaching or lixiviation treatment of ores, setting forth the virtues and feasibility of the process, and in another article commenting on the process, it says: "Although the process of leaching (or lixiviation) ores has long been known, it is only within the past few years that it has attracted so much general attention. Certain classes of ores from which the precious metal cannot be fully recovered by amalgamation, can be successfully treated by this process. The system has been fully described by Aaron and Kustel in their respective books on the subject, and the improvements by Russell, described by Stedefeldt, have added to the interest and value of the process." The *Range* will not hesitate to say that a recommendation from the columns of such a journal as the MINING AND SCIENTIFIC PRESS is of great importance and substantiates that the process is a good one when put to use in a locality like ours where the ores are especially adapted to that treatment.—*Black Range, N. M.*

A SIXTY-STAMP MILL.—It is rumored about town that the Oro Grande Mining Company will soon put up a 60-stamp quartz mill on the Waterloo mine in West Calico, and have ordered the machinery. There is plenty of ore in sight to run a mill of that capacity for years, but the company have only made the plans for the plant, which have been sent to foundries in San Francisco and Chicago. The erection of a mill on the above mine is only a question of time, and as large companies move slowly, it may be months before the mill is erected; but as the ore in the Waterloo is so easily mined and such a large profit can be realized from even low-grade ore, it is most probable that the company will construct the reduction works as soon as possible. When this mill is built then the company's 15-stamp mill near Daggett will be used to reduce the ore from the King mine, and the force of men now prospecting the same will be increased to a number sufficient to extract ore enough to keep the mill running day and night.—*Calico Print.*

SAMPLING WORKS.—The mining business bordering on this valley along its length of more than a hundred miles is essentially of a chloriding nature. There are perhaps a hundred different mines from which ores are being extracted in various quantities and kinds and sent out of the country for reduction. A reliable sampling establishment at some central point on the railroad would do a paying business for itself, and at the same time promote the mining industry wonderfully—with a good concentrating plant it would be just the thing.—*Inyo Register.*

CONTRIBUTIONS TO MINING BUREAU.—The State Mining Bureau has lately received a set of volcanic rocks from Iceland and a set of coal specimens and inclosing rocks from the new coal mine Mark West, Sonoma Co., Cal., from W. L. Watt; rich ore from California mine, Comstock lode, from new ore body discovered late in 1886, from W. H. Patton; silver ores from Calaveras Co., Cal., E. J. Rogers; set of the Stassfurt salts, Jno. Bryant; ores from Coeur d'Alene and Idaho, P. A. Murkson; Arizona ores, J. Z. Davis.

TEMPTING PROVIDENCE.—Though not immediately apparent, there has been a steady increase of arrivals on the Comstock from outside camps, the greater portion being miners in search of employment. While it is desirable and to be hoped that they will all procure work, it is extremely doubtful. The Comstock has quite a sufficient supply of idle miners already, and those in outside camps should be warned that it is only tempting Providence to come here now.—*Virginia City Footlight.*

The citizens of the mining section of Fresno county are in hopes that in the near future the people of the northern part of the county will demand a division for geographical as well as other plausible reasons, with Madera as the county seat. Madera is the shipping point for all of the mining districts in the county that are producing bullion. Over \$100,000 worth of mining machinery, lumber and supplies will be shipped to Hildreth and Fine Gold during the coming year.—*Fine Gold Miner.*

NEW MINES.—There is a new mining district somewhere near Susanville called Diamond Mountain. They have a small mill running that makes a good showing, and several lodes are being developed with excellent prospects. The work has been done by Susanville people in a quiet way. We learn this much from the *Lassen Advocate*.

D. GIROUX, of Winnemucca, who has the mortgage on the Oreana ditch, Nevada, is at work taking the timber out of the tunnel. The ditch and tunnel cost \$70,000, and are a total loss except 15 cars of timber used in the tunnel. It will be shipped to Eureka.



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SAN FRANCISCO:

Saturday Morning, Feb. 12, 1887.

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Passing Events.

The close of last week brought an unusual occurrence in this latitude—a veritable snow-storm, which completely covered the hills around the bay, and gave San Franciscans an opportunity for once to indulge in snowballing. Several inches of snow fell in this city and on the adjacent hills.

The Legislature is hard at work and considering many important bills. A summary of what is being done is given in another column.

Up in Nevada county the severe storm has put a temporary stop to mining operations, where the water is depended on for power. Heavy rains have fallen all over the State, to the great delight of all Californians, who were fearing another dry season. As we write—Thursday—the rain is still falling.

The sensation of the hour in the city is the excitement arising from the bomb-throwing at the Grand Opera-house on Wednesday night, in the midst of a crowded audience. Fortunately, the man creating the mischief was the only one hurt. This caps the climax of the dynamite outrages so unpleasantly frequent here of late, and it is the hope of the people that fit punishment will be meted out to all who are detected.

The fears of a dry season are all past, and miners and farmers can now count on a prosperous year.

ELECTRIC LIGHT IN PEARL FISHING.—A Glasgow yacht, destined for pearl fishing in South Australian waters, has been fitted with electrical apparatus expected to light up the water to the great depth of 17 fathoms.

The Bank of California has attached the Spring Valley mine, Oherokee Flat, Butte county.

Mining Under High-Pressure Conditions.

California, measured by population, occupies a very low rank among the States of the Union, her position in this respect giving some color to the argument of those who incline to question the utility of the great gold discovery as a means of increasing the permanent population of the country.

But this argument, so far as it has any force, applies only to those surface placers which, being extremely rich and easily reached, present especial attractions to the hordes of adventurers who first came to California, and who, when this class of deposits had been exhausted, there being nothing left to keep them here, took their departure never intending to return.

But while these shallow diggings, so easily reached and so readily depleted, did so little toward building up and populating the State, they contributed just as little toward developing and laying the broad foundations of that mining industry which constitutes to-day a leading factor of California wealth and one of the great sources of our national prosperity. Not only so, but had these diggings never existed, it may well be that this great industry would have suffered little or no detriment. It may well be that if never a rich gulch, river-bar or shallow placer had been found in all the length and breadth of our gold fields, the business of mining for the precious metals would have been further advanced than we now find it.

If we had had only our deep-lying Pliocene channels, our hydraulic banks, our river-beds and gold-bearing quartz lodes to begin with, it is probable that these branches of mining, on which the future of the industry must mainly depend, would have attained to a larger development and a higher perfection than they have yet reached. Inaugurated as they were, these more stable and enduring branches of the business had to labor under all the disadvantages of high prices, uncertainty and disorder incident to the era of pioneer mining in California. They who then engaged in these pursuits had to begin and build from the top. They had no chance to lay first a firm foundation on which to rear the superstructure. The conditions on which most staying industries are founded were here largely reversed. Instead of beginning on a low plane and expanding little by little, these branches of mining were forced suddenly into existence, the men who inaugurated them being without experience and hardly ever able to obtain skilled assistance. But for the excessive prices, the hurry-scurry, crime and disorder attendant on the working of the shallow placers, all this would have been so different that we may well believe these more underlying branches of mining would have been brought into their present thrifty condition at a much earlier day. And when we contrast the present state of things, characterized by its quiet order, security to person and property, and the sure and ample rewards it brings to both labor and capital, with the tumult, the excitements and the uncertainties of these pioneer times, we consider it no great misfortune that these latter should so soon and so utterly have passed away.

In this our California experience there is supplied another example of the ill effects of beginning a business that it is expected will prove permanent under high-pressure conditions. Mines that commence in bonanza are apt to prove treacherous and short-lived. Had the first finds on the Comstock range consisted of large bodies of medium-grade ore instead of the bonanzas developed there at the start, the great Washoe lode would not probably be reduced to the moribund condition in which we now find it. Certainly its history would have been marked by less of disaster, though the bullion product were somewhat smaller than it has been. A brief career and an ugly ending seem to very often await these extra rich finds, as witness others beside the Comstock that have occurred in the State of Nevada. The Eberhardt bonanza of White Pine memory, one of the richest and for its size one of the most valuable ever found, was dug out in a couple of years. Through its sudden exhaustion the country, which it brought into merited notoriety, has suffered such a setback that both capital and enterprise have avoided it ever since. And yet this White Pine region possesses such mineral resources that, but for this fatal booming it would very likely have been a populous and prosperous mining district to-day. Too much premature blowing

has worked a harm to many promising mining camps. The reaction that comes of disappointed expectation is always damaging. It leaves the subject prostrate and so nearly lifeless that it takes time and labor to restore animation. The real interests of Tombstone, Cœur d'Alene and Leadville, not to instance numerous other localities, have been greatly prejudiced by extravagant claims and overpraising. We consider it matter for congratulation that the mining industry of California having passed the dangerous epoch of bonanza strikes, ounce diggings, stampedes and excitements, has reached that safe and sober stage that so befits the business.

The Vrooman Dynamite Bill.

Senator Vrooman has introduced a bill which is designed to prevent any person not engaged in the manufacture, sale, transportation or legitimate use in blasting operations or the arts, from being able to obtain dynamite, nitroglycerine, vigonite, Hercules powder or other high explosives. It provides that manufacturers or dealers in these substances shall keep an account-book of record of all sales, etc., giving names, quality, destination, etc., which book shall at all times be open to inspection by police authorities. Failure to make such record is a misdemeanor, and subjects the manufacturer or agent to a fine, half of which goes to the informer. The bill provides that unauthorized people having in their possession any of these high explosives under certain circumstances are guilty of felony. The final section of the Act is as follows: "Any person, firm or corporation who shall take, carry or transport, or cause to be taken, carried or transported, any dynamite, vigonite, nitroglycerine, Hercules or giant powder, or other high explosive, into the limits of or through or across any incorporated city or town of this State, or in, through or across any harbor for shipping, in manner, condition or quantity or otherwise in violation of the laws or ordinances of such city or town, or of the laws and regulations governing such harbor, shall, in addition to the penalties provided or imposed by such laws, ordinances or regulations, forfeit to the State of California all such explosive substances, as well as the cases inclosing the same. Such forfeiture may be sued for by any citizen of the State, for himself and the State, and the goods or property, when so forfeited and recovered by judgment of the court, shall be sold and the proceeds divided, the citizen so suing taking one-half to himself for his own benefit and paying the other half into the State treasury."

The general public would be very glad to have all these dynamite assassins punished, and glad to see legislation which would put a stop to the throwing of bombs and firing of explosives. But it does not seem as if this bill would accomplish all that is looked for. It will work serious inconvenience to the manufacturers of high explosives, of which there are a number in this city. On this coast, in mining, railroad and work of like character, vast quantities of high explosives are made and used. It must be transported from the factories to its destination. It seems rather hard to interfere with so important an industry as powder-making in the way proposed. They cannot keep track of every pound of powder sold. If they sell a ton or so to a mine up the country, vicious people might obtain it from the mine, but the powder company could not be blamed. The substances are necessary for certain operations. Most of them are made to order only, and no large stocks are kept on hand by any of the companies. The provisions of the bill are impracticable in the opinion of the powder companies. The law strives to make them responsible for creating the powder. If the law would promptly punish men when caught, the dynamite outrages would soon stop. The few pounds of high explosive needed for such outrages will doubtless be obtained about as easily after the bill is passed as now, while the manufacturer will be put to great inconvenience. The mining community, too, will be troubled by the passage of this bill, as they use large quantities of powder. There should be modifications and amendments to the bill, which would cause less interference with the operation of powder manufacturers and dealers, while at the same time the real object would be accomplished. It seems improper to hamper a great manufacturing interest because a few misguided men use its products to evil ends.

The Lick Telescope.

Its Possibilities Practically Considered.

The people of this State point with pride to the fact that upon one of our mountain-tops will soon be mounted by far the largest refracting telescope in the world. We are very likely to hold this honor for some time to come. The difficulty of obtaining a disk of crown glass of such dimensions as that required for the Lick telescope, was such as to cause the financial ruin of the firm that undertook the task of casting it, and for a time it appeared that success was almost beyond hope; but the nineteenth trial was successful. With such experience, another disk of equal or larger size will probably not soon be again attempted. To produce this grand optical wonder required many thousands of dollars, many years of time, and the best skill of two continents. The elder Clark is now 84 years of age, and this is probably the last great telescope to receive his magic touch, and is the crowning work of his life. No other optician has ever made so many large telescopes; therefore, we need not fear that the telescope on Mt. Hamilton—the pride of our State—will soon be eclipsed by a larger one.

Our citizens, too, look with eager expectancy to the time when the great telescope will explore the depths of space, throwing new light upon many questions brought forward by the greatest of sciences—astronomy.

So much has been said about this telescope, however, that the public has very exaggerated notions of its optical power, as well as of large telescopes generally. For instance, the general public would take it as a matter of course, if it appeared in print, that the Lick telescope would bring the moon so near that it would appear as if only one mile away; or that a city as large as San Francisco could be seen upon the planet Mars; yet under the most favorable possible conditions that can ever be hoped for, even on Mt. Hamilton, with the very highest magnifying power that the great lens will bear, the moon will not be as well seen as it would be with the naked eye at a distance of 300 or 400 miles. Upon Mars, with the Lick telescope, probably as large an aperture as can be employed with favorable results, we could not hope to see the planet better than with the unaided eye at a distance of 25,000 miles. To discover evidences of life is utter nonsense!

It may seem strange to readers who have given no thought to the subject, that in viewing certain bright objects there is a point in size where a comparatively small telescope would give better results than a larger one. Reflecting telescopes can be made of much greater dimensions and light-giving power than the Lick, but it is at least an open question if better views could be obtained of the planet Mars with larger apertures. In the *Observatory* of October, 1885, Mr. W. F. Denning, F. R. A. S., and an astronomer of note, uses the following language:

"* * * 'In the giant telescopes of the future, still less will be seen than in the incomplete views now afforded by the refractors of Chicago and Washington. The belts on Jupiter and the seas on Mars will nearly disappear amid the brilliant, overpowering light from a 10 or 12-foot reflector! There will be blazing disks, affected by incessant molding and flaring, and nearly devoid of reliable markings. * * * Ultimately men will see that they do not want light to look at the sun, nor enormous apertures to increase the turmoil of the air. They will come back to small instruments, and do better with them in studying the surface phenomena of bright planets.'"

If telescopes only increased in power in the same ratio as they increase in size, the Lick instrument would be the king of refractors and would practically have no competitors; but except on faint objects the 8 to 15 inch aperture telescopes prove themselves to be formidable rivals to the larger ones, for, as Mr. Denning says, "what the minor telescope lacks in point of light it gains in definition. When the seeing is good in a large aperture it is superlative in a small one. When unusually high powers may be employed on the former, far higher ones proportionately may be used with the latter."

A 10-inch objective has an area of 79 square inches, while the Lick has 1018, or about 13 times the light-collecting power of a 10-inch, but it would utterly fail to bear 13 times the

magnifying power. Two and one-half, or at most three times, would be the limit of magnifying power over the 10-inch, and then only on rare occasions; for, on what may be termed "poor seeing nights," a 10-inch would do almost as well on bright objects, and neither would give satisfactory results.

Telescopes from 4 to 6 or 8 inches aperture will, under exceptionally favorable conditions, bear a magnifying power of nearly, if not quite, 100 to the inch of aperture; but a practical astronomer would not expect an instrument of 25 or more inches aperture to bear such relatively high powers, for the reason that every defect in the glass (and we cannot expect an objective of 30 or 40 inches to be as perfect as smaller sizes), every vibration of the mounting and every tremor in the atmosphere would be magnified as much as the object observed; and as these obstacles to perfect definition increase with the size of the instrument, it is plain that a point can be reached beyond which it will be useless to go. This is in perfect harmony with the opinion of Prof. Newcomb, one of the very greatest astronomers in the world, who expresses himself as follows concerning the great refractor: "Still, the defects arising from the secondary spectrum are inherent in the latter" (the refractor), "and increase with the aperture of the glass to such an extent that no advantage can ever be gained by carrying the diameter of the lenses beyond a limit which may be somewhere between 30 and 36 inches."

Again, these immense telescopes put obstacles in the way of the astronomer and the mechanic that are scarcely noticed in smaller instruments. Thus, the tube of the Lick instrument will be over 50 feet in length. It cannot be supported at many points throughout its length, but must necessarily be supported at only a single point near the center of its length. With the cell and lens weighing a matter of 600 pounds at one end of the tube, it must yet be perfectly rigid—flexure of a fraction of an inch in any of its multitudinous positions would be injurious to its good performance. Then, too, the contraction and expansion of a tube of metal of such length must be another serious question, for the lengthening or shortening of the tube of only a few hundredths of an inch will require constant readjusting of the eye-piece when using high powers. A single current of warm or cold air could easily produce changes that would have a very serious effect on an instrument of such superlative sensitiveness.

The temperature of the disks forming the objective must be as near as possible that of the surrounding atmosphere to obtain good results, and while this condition may usually obtain, the question of temperature is often a serious one with large telescopes.

However, while we should not let these exaggerated and ridiculous notions lead us, we may still be sure that the great instrument on Mt. Hamilton will give our State a world-wide reputation. Prof. Holden is young, energetic, has great ability as an astronomer, and is ambitious to make a great name for the Lick Observatory; and, while we should rid ourselves of the preposterous ideas that the public seems to have, we may expect that, with a site so perfectly adapted for astronomical research as Mt. Hamilton, and a telescope which seems to be as large as there is any use to make them, that the greatest hopes of astronomers—if not the public—may be fully realized.

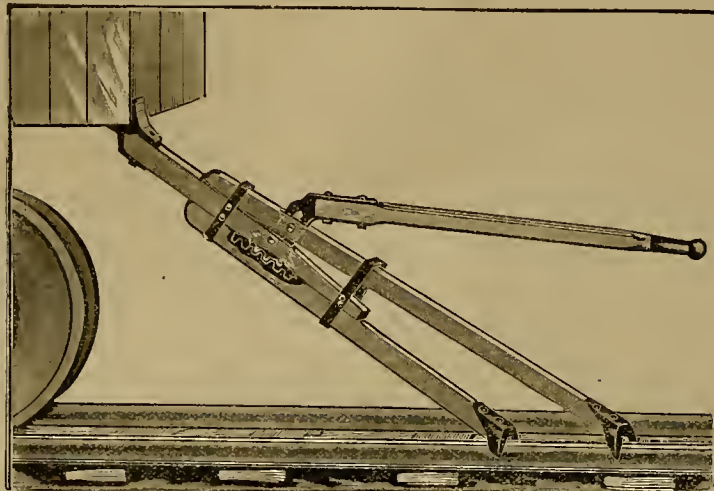
There are two important branches of astronomical research, however, in which the Lick telescope stands head and shoulders ahead of all other refractors, namely, faint objects and stellar photography. This great telescope will bring into view thousands of stars that in the 30-inch belonging to the Russian Government, and in other large telescopes, will be entirely invisible; and having a third lens to transform it into an enormous camera, it is without a rival worthy of the name. This latter improvement alone will make it by far the most valuable instrument in the world, and will immensely increase the number of known stars, besides furnishing data for the study of stellar parallax, variable stars, and it will probably add more to our knowledge by this means than by any other work in which it could be employed.

The Redding foundry is working up quite a trade in the casting of shoes and dies for quartz mills.

The Monarch Car-Mover.

All who have had to move railroad cars at stations or side-tracks, when loading or discharging them, know how difficult it is to do so with the ordinary pinchbar. The "dead weight" of the car has to be overcome each time after they get a new hold, and the "give" or play of the trucks causes a lost motion of at least half the distance that ordinary devices can move the car. There are so many places where cars have to be moved without the aid of engines that an efficient mechanical appliance for the purpose has long been needed.

Barnhart's car-mover, illustrated by the cut on this page, is a new device by which a continuous pressure can be exerted on the rear end of the car so that it can be readily moved. The



BARNHART'S CAR MOVER.

device is quite simple in construction and operation. When the handle is raised the lower leg grips the rail, holding its position, while the center bar is moved forward, propelling the car, and the upper leg moves forward and up to the lower leg. When the handle is lowered, the upper leg holds its position, the center bar continues to move the car forward, and the lower leg, now released, moves forward away

work. Mr. G. S. Suider, of 312 Mason street, this city, has the patent rights for California and Oregon, which he is desirous to dispose of to an individual or company. The appliance is one of those useful American inventions for labor-saving and convenience which once seen in operation will be readily appreciated.

Copper in Warren District, Arizona.

The principal mines of the Warren district, Arizona, are found in limestone of the lower carboniferous age. The Mule Pass mountains are a short distance east-and-west range, produced by the upheaval of the lower carboniferous material, which overlies the huge mass of eruptive rock. The accompanying engraving from Mr. Wendt's paper, before the Institute

rarely shown as completely as in the principal copper mines of this district, and it seems to have been accompanied at the same time by a deposition in the adjacent country rock, which now forms the walls of the veins, of both silica and alumina, and more or less copper. At one point in the Copper Queen some 200 feet below the surface, the walls of the ore body are well defined, perfectly smooth, and separated from the hanging-wall by a clay gouge some two inches thick. The clay gouge readily flakes off from the smooth hanging-wall, and the wall itself is decolorized and stained almost black. Samples taken from this wall carried one per cent copper and considerable iron, alumina and silica.

Legislative.

Considerable time has been devoted to the discussion of the Goncher bill, providing for an appropriation of \$125,000 for the State Mining Bureau. The committee reported in favor of \$60,000, but an amendment has been adopted, reducing the appropriation to \$30,000. The main obstacle to its passage within the past few days has been the obstinate fight made by Senator Clunie to have incorporated in the bill a clause making it obligatory on the part of the Controller to pay out of the appropriation about \$1900, which ex-State Mineralogist Hanks had borrowed from Wells, Fargo & Co. The exact amount of indebtedness of Mr. Hanks to the banking firm is unknown, and a decided opposition was manifested to establish a precedent making the State liable for any debt contracted by officials. Wells, Fargo & Co. advanced certain moneys to the institution some time since, with the expectation of being repaid by the Legislature.

The section added, at the suggestion of Caminetti, to Wright's irrigation bill, will protect the mining industry, and reads as follows: "Navigation shall never in any wise be impaired by the operation of this Act, nor shall any vested interest in or to any mining water rights or ditches, or reservoirs, or dams, or in or to any water or water rights, reservoirs or dams, now used by the owners or possessors thereof, or by persons purchasing or renting the use thereof, or in or to any other property, now used directly or indirectly in carrying on, or prompting the mining industry, ever be affected by, or taken under its provisions, save and except that rights of way may be acquired over the same."

Senator Walrath's bill authorizing the construction of dams for impounding debris, has been amended in committee by requiring the plans of the dams to be constructed, to be approved by the State Engineer, or in the absence of such officer by a competent engineer to be appointed by the Governor. We give this bill in full in another column.

Goucher introduced a bill amending the political code, authorizing trades unions and labor organizations to adopt a trademark and affix it to goods manufactured by them. The code is made applicable to the trademark, and punishment is prescribed for counterfeiting.

The Committee on Labor and Capital reported in favor of the passage of the bill (414) to protect the health and regulate the hours of labor of streetcar conductors and drivers and grip-men.

Ohleyer's bill declaring hydraulic mining a felony had its enacting clause stricken out, and was by this means killed.

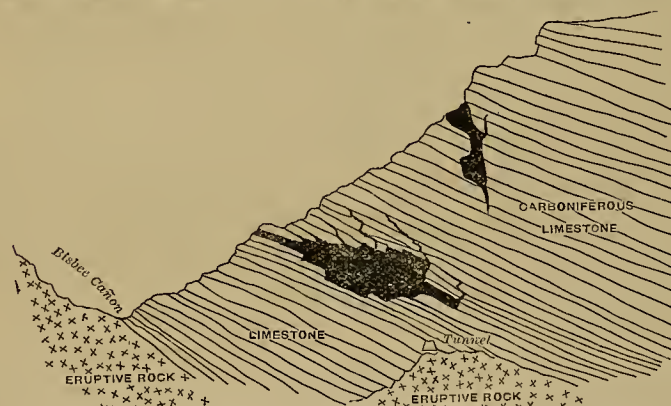
The bill which gives a fixed income to the University of California has passed both houses, greatly to the joy of the friends of that institution.

The anti-dynamite bill introduced by Senator Vrooman is referred to elsewhere in this number of the Press.

The San Francisco Copper Mining Company, which has been operating at Spenceville, in this county, for a number of years, makes a regular monthly output of 25 to 30 tons of cement copper. The same company is also operating at Campo Seco, Calaveras county.—*Grass Valley Union.*

Now is the time of year when large, rich quartz ledges are discovered and fortunes made, with the jaw of the man who sits around warm fires with his feet on the stove.—*Placerville Observer.*

The Old Guard mine, near Benson, Arizona, has been sold to English capitalists.



BISBEE CANYON, SHOWING ORE-BODIES IN LIMESTONE.

from the upper leg. The alternate raising and lowering of the handle thus gives the machine a continuous walking motion, and so in addition to the great lever power, the motion itself, or inertia of care when once started, helps materially, as there is no "dead weight" to overcome at each stroke. The lower end of the legs are shod with steel and rest astride the rail, fitting any size. The device will move "dead" engines in roundhouses or repair shops. It will act on up-grades or curves and keeps the car in constant motion as long as desired.

This little apparatus does away with vexatious loss of time and expense in waiting for shunting engines. It is useful for placing cars just where they are wanted at railway sidings, freight sheds, warehouses, gravel pits, quarries, coal or lumber yards, wharves, mines, limekilns, foundries, factories, etc. Very little strength is required to operate this, the leverage being so powerful. It would seem that this device could be utilized instead of "jacks" in moving the heavy logs of this coast on the "landings" in the woods, as it keeps up a continual pressure and does not have to be moved or lifted each time a new hold is taken. Its special usefulness, however, is for railroad

work. Mr. G. S. Suider, of 312 Mason street, this city, has the patent rights for California and Oregon, which he is desirous to dispose of to an individual or company. The appliance is one of those useful American inventions for labor-saving and convenience which once seen in operation will be readily appreciated.

of Mining Engineers, illustrates the character of deposition of ores in these rocks. The limestone forms the south slope, and the eruptive rock the north slope of the canyon. In the deep workings of the Copper Queen (in the southerly canyon) on the 400-foot level, the top of a mass of eruptive rock has been found, which has been microscopically determined by Dr. A. Julien to be a felsite porphyry.

In this district, as in Clifton district, a distinction can be made between veins and ores found in the limestone and those in the silicious and eruptive rocks.

The copper ores in Warren district all occur in true fissures, and the two principal mines, the Copper Queen and Copper Prince, present great similarities, and in every particular carry out the description of "bed veins" given by Cotta. The outcrop of the ore starts between the bedding of the limestone, and, as Cotta remarks, the ore bodies might be mistaken for orebeds, and not bed veins, were it not for the presence of spurs in the walls.

The figure given illustrates this structure. The spurs in these ore deposits usually follow the planes of bedding of the limestone. The limestone generally occurs in blocks, and the ore then follows the plane of bedding until it comes to a cross seam from one bed to the other, when the ore will sometimes jump to the next seam. In places, the seams are several inches or even a foot wide. In other places, what have evidently been caves or vugs in the limestone, have been filled by the ore. Not all the caves near the ore bodies contain ore.

The deposition of copper from a liquid is

MECHANICAL PROGRESS.

History and Manufacture of Augers.

The principle of the auger now in use all over the world is said to have been discovered by accident. In 1680 Benjamin Pugh, an Englishman, while watching some boys working endeavoring to bore a hole in the ground with a piece of iron barrel hoop, noticed that after the hole had been sunken some distance into the earth, and the pliable metal of their improvised tool had become heated, it twisted and carried the dirt up to the surface nicely, and he could not see why the same principle should not apply to wood. The invention of the auger was the result.

The screw-auger is an American invention, and was invented about 100 years ago by Thos. Garrett, who lived in the vicinity of Oxford, in Chester county, Penn., where most of the black augers are still made. Most of the bright tools are made in the East, but one of the principal manufacturing is in Philadelphia. The old-fashioned pod auger is still used in England and Germany. The single-screw auger is also an American invention, and was discovered by accident by a Philadelphian. It is the only auger that can be used to any satisfaction in very hard woods, where the double-screw augers become clogged.

In the olden time, and until less than 50 years ago, the feature of any manufacturer was the excellence he could produce in quality, and as nearly everything was made by hand, it did not receive the beautiful polish that, at the present day, adorns the cheaper and inferior implements. In preference to a polished surface the inventor and manufacturer of double-twist augers made the twist black and unpolished. It thus showed the handwork that had been put on it, and it is still a well-known fact that hand-made tools are far superior in quality and workmanship to all others. As manufacturing industries increased, augers began to be made with a high polish and heavy, but the consumer soon found they were of inferior quality, and would inquire for the black-twist auger, knowing it to be the old-fashioned genuine kind.

Its Manufacture.

Although every one is perfectly familiar with this commonplace tool, but comparatively few know the process of its manufacture. In making augers the iron which forms the main or spiral part is welded into the steel of which the tip is made before forging. The bar is then put under hammers and forged into shape. It is then put into what is called a "wringing machine" and twisted up in a rough state into the spiral form, after which it is passed through "crimpers," giving a uniformity of twist. The augers are next put through "straighteners" and revolved, making them perfectly straight, when they are ready for putting on the head, which is the most delicate operation in their manufacture, and requires the work of a skilled artisan. They are then subjected to a "grinding-out" process, which consists of putting them through two rubber wheels to rough-polish the twist. The "fitter up" then takes hold of them and "lightens" or fits the head; then the fliers file down and sharpen the heads, after which they pass through the hands of the polishers, where they are polished and hardened ready for market.

LIFE OF CAST-IRON PIPES.—The fact is well sustained that the wear and tear by rust in uncoated cast-iron pipe exposed to the action of clean, fresh water on both sides is not more than one-eighth inch in three generations. With the present method of protecting such pipe with asphaltum, the life of the ordinary cast-iron pipe used in building construction may be greatly prolonged; indeed, even an ordinary coating of coal-tar pitch, when properly applied, is sufficient to add at least a score or two of years to its durability. The life of a soil pipe, even when quite thin and uncoated, has been found by experience to be so great that it is not unreasonable to suppose that the greasy matter contained in sewage serves to coat and protect the iron from the corrosive action of the water and the acid component of the sewage. The defects and leakages more generally met with in such pipes are caused by the defective manner in which the joints are made, and improper placing and securing.—*London Ironmonger.*

ANCIENT LEAD PIPE.—Although the production of lead pipe has commonly been regarded of quite modern origin, there appears to be evidence that the Romans were acquainted with the article, without, however, possessing the appliances for fabricating anything of large dimensions or efficiently strong to withstand any very great pressure. In the Chertwell Museum is a piece of lead piping made by rolling a sheet of metal, turning the edges over and then running molten lead along the joints.

EXPORTING LOCOMOTIVES.—Nearly one-fourth of all the locomotives built at the Baldwin Works, during the last 10 years—900 out of a total of 4000 built—have been exported to foreign countries. This is a most interesting fact, and speaks volumes for the skill and enterprise of American mechanics. The Baldwin locomotives secure these markets by reason of the superiority of their engines, as well as because the price is lower, and both of these results are obtained without paying the low prices

for labor that obtain in the English shops. It is in this direction that we must look for export trade, superior work at the same or less prices, the result of better labor, better appliances and better methods. Such trade will be dearly bought if it is the result of lower tariffs and reduced wages.

A Novelty in Fort Construction.

Sir Henry Bessemer has proposed quite a novel method for the construction of armored forts. He would manufacture the steel plates directly upon the ground. Writing to the *London Times*, he suggests that he would obviate the enormous expense of ordinary armor plates for forts, by casting *in situ* the whole face of a fort or complete turret in one solid piece of steel, with all its ports and loop-holes properly shaped and formed in the act of casting. He says: Let us take as a simple example the production of a fort with a curved face of 100 feet in length, 16 feet high and 3 feet in thickness, such a plate would be molded after the manner practiced in ordinary iron foundries—that is, with brick walls held together with iron binders and internally lined with fire-clay.

Alongside this mold would be placed the melting cupolas and four fixed 20-ton Bessemer converters, each capable of turning out 18 charges per day of 24 hours, thus delivering into the mold one ton of molten steel per minute. At this rate of working the mold would be filled in 16 hours, and produce a single plate weighing 960 tons, requiring no backing or superstructure for its support, and no expensive fitting together of separate parts. The ordinary technical difficulty to be encountered from the static pressure in the mold tending to burst it open would, in this system of slowly filling the mold, be extremely small, owing to the fact that the metal will solidify at the lower part, leaving only a half foot or so fluid at the upper part. It will be equally obvious that it would be quite impossible to destroy such masses of steel as could be produced by any existing artillery, while the price which such castings would cost at a time when we can purchase finished steel rails at £3 15s. per ton will be readily understood. Sir Henry Bessemer, in conclusion, reminds the Government that he has long since ceased to have any pecuniary interest whatever in steel manufacture, but offers to afford them any information.

STEEL RAILROAD TIES have not yet passed quite out of the experimental stage, at least not in this country. An examination of the steel sleepers made by the Barrow Hematite Steel and Iron Company, and laid by the Northeastern Railroad Company, of England, in March, 1885, has been made, and the result is said to have been in every way satisfactory. The inspector is of opinion that the sleepers will keep good for 20 or 25 years, whereas the old-fashioned wooden ones only lasted from 12 to 14 years. But when the fact is taken into account that steel sleepers cost more than twice as much as the wooden ones, their economy is at least doubtful. The wooden sleepers cost less for transportation and are not so troublesome to lay; but when once in place the steel ones give less trouble. Steel sleepers are an undoubted success in India, however, from the fact that insects are there very destructive to wood, especially when upon or in the ground.

HAMMERING.—There is a difference in the driving effects of a light hammer when compared with the blows of a heavy one, or a rusty machine bolt would not remain to be riveted up all out of shape when a six-pound sledge will take everything before it. The driving effect from any source seems to require time to act in order to extend a great way into the material. This is noticed in heading up a rivet, where the metal can be worked down into a cone-shaped head by the upsetting effects of a sharp blow, which will be crippled at once under the crushing force of a sledgehammer.

IRON THEN AND NOW.—It is often observed that iron of recent make rusts and wears away much more rapidly than samples made 40 or 50 years ago. The more rapid deterioration of much of the iron of a late make arises from the fact that it contains more impurities than formerly. The common iron of to-day is filled with slag, and looks coarse and fibrous when rusted or worn. Fifty years ago the iron made in the United States was largely charcoal iron, and was much purer and better than the same grade made at the present day.

A NEW LAMP REFLECTOR.—In the course of some experiments made under the direction of the Northern railroad of France, it has been discovered that soft steel plates can be covered by a process of rolling with nickel, and so effectively as to render them as valuable for lamp reflectors as silvered copper.

KNIFE SHARPENING.—To hone a jack-knife, raise the blade on the back from the bone. It takes the polish off to lay the blade down flat; and leaves too thin an edge to stand the hard usage required. The delicate polish that the bone will not imitate is "set" with walrus-hide wheel fed with rottenstone.

SPEED OF TURBINES.—To get a good working speed for a turbine, allow the wheel to run free for awhile and then reduce its speed one-third. Fifty per cent is an allowance that will only work when there is no hindrance to the flow of water or resistance through the wheel.

SCIENTIFIC PROGRESS.

Ice, Water, Vapor and Heat.

The quantities of heat inherent in water, in its three different conditions, are as follows:

1st. Crystallized water (i. e., ice) contains 40 degrees of latent heat. The properties of water, physically considered, when in a state of ice, resemble those of other solid bodies—in this respect, that its atoms are in close contact, having strong cohesive powers, and are incapable of motion or change of position, *inter se*.

2d. Liquid water contains 140 degrees of heat. In the state of liquid, the immobility of water is changed to mobility, with a strong attraction among its several atoms and particles.

3d. Gaseous or aerified water (i. e., vapor) contains 1000 degrees of heat. In the state of vapor, attraction and mobility give way to atomical repulsion and divergence, the immediate effect of which is diffusion. And the element of mutual repulsion between the atoms, combined only in opposition to gravity, is a leading characteristic which must be studied by every proficient master steam fitter.

On heat being applied to a body of ice, the cohesive property of the constituent particles, which come into contact with it, is lost. The particles separate from each other, and, falling from the mass, by the force of gravitation, form a liquid. If heat be continued, such of the watery atoms as may receive an additional unit will assume the vaporous state; and as it had previously received its full complement of latent heat, the additional unit will become sensible, or available heat. A vapor atom may, therefore, be described as the union of one atom of liquid with three units of heat—say two of latent and one unit of sensible heat.

We have numerous works, some of very high authority, essaying to explain the generation of steam; but it is remarkable that no one has yet clearly and satisfactorily explained what is vapor (which steam so closely resembles), how and where it is formed, what really are its special properties, in what does it differ physically and dynamically from liquid water, what are the exact relative proportions of latent and sensible heat in either, and what relation has vapor to electricity.

Heat is diffused or communicated by conduction and radiation. When it passes slowly from one portion of matter to another, in contact with it, it is said to be conducted; and the process, in scientific language, is termed the conduction of the caloric. Metals are the best conductors, then liquids, and lastly, gases. Gold, silver and copper are the best conductors among solids; glass, bricks and many stony substances are very bad conductors; and porous, spongy substances, as charcoal, hair and fur, are the worst. Clothing for cold weather should be made of bad conductors, so that the heat of the body may not be conducted quickly to the surrounding atmosphere. Furnaces, where great heat is required, are built with porous bricks, to prevent the escape of heat to adjacent bodies.

Fifty-five degrees (Fahrenheit) is reckoned moderate heat, and 76 summer heat (in the most civilized latitudes); 98 degrees is the heat of the blood in the average of healthy men.

MEASURING ELECTRICITY.—Ampere, who discovered many laws in regard to electric currents, writes concerning some of the special characteristics of that element as follows: A current of electricity acts almost exactly like a current of water flowing in a pipe. We shall make hardly a practical mistake if we think of it as a current of liquid. Edison speaks of it as "the juice." Just as a liquid needs a "head" to make it flow, so a current of electricity has a "pressure" or "tension" or "electromotive force," always written E. M. F., which makes it flow. As you measure the head of water in feet, so the pressure, tension, or E. M. F. of the electric current is measured in volts. (From Volta, who discovered the electric battery.) Now as a current of water may have a high head, with but little water, and yet exert great power, like a mountain stream, so an electric current may have great tension, a large number of volts, and yet contain little electricity. Lightning is a good example of enormous electric tension with but very little electricity. On the other hand, we may have a low head of water, and a great powerful stream flowing, like a river, so the electric current may have a low tension, pressure, or E. M. F., and yet contain an enormous quantity of electricity. Or we may have both a high head and a large quantity of water—a Niagara falls—and similarly a high pressure and a large quantity of electricity. Then there will be practically two kinds of electric currents of high and low pressure. Now just as we distinguish between the head of water and the amount of water flowing—so in electricity we distinguish between the pressure—the volts, and the quantity of electricity flowing, i. e., the current itself. As we measure the water current in gallons, so we measure the electric current in amperes.

DESTRUCTION OF TROUT BY MOSQUITOES.—A recent bulletin of the United States Fish Commission contains the following interesting account: "In the middle or latter part of June, 1882, I was prospecting on the headwaters of the Tumichie creek, in the Gunnison valley, Colorado. About 9 o'clock in the morning, I sat down in the shade of some willows that skirted a clear but shallow place in the creek.

In a quiet part of the water, where their movements were readily discernible, were some fresh-hatched brook or mountain trout, and circling about over the water was a small swarm of mosquitoes. The trout were very young, still having the pellucid sack puffing out from the region of the gills, with the rest of the body almost transparent when they swam into water lighted up by direct sunshine. Every few minutes these baby trout, perhaps to get the benefit of more air, would come up, so that the top of the head was level with the surface of the water. A mosquito would then light down and immediately transfuse the trout by inserting its proboscis, or bill, into the brain of the fish, which seemed incapable of escaping. The mosquito would hold its victim steady until it had extracted all the life juices, and when this was accomplished, and it would fly away, the dead trout would turn over on its back and float down the stream. I was so interested in this before unheard-of destruction of fish that I watched the mosquitoes for more than half an hour, and in that time over 20 trout were snatched dry and their lifeless bodies sent floating away with the current. I have been unable by inquiry to ascertain if others have observed a similar destruction of fish. From this observation I am satisfied that great numbers of trout, and perhaps infant fish of other varieties in clear waters, must come to their death in this way; and if the fact has not been heretofore recorded it is important to those interested in fish-culture."

Wonderful Operations of Electricity.

Every current and portion of the electricity in nature, says a contemporary, is occupied in a useful work, and a particle of it cannot be employed for the purpose of operating any of the contrivances of persons. A person is compelled to obtain a current for his own use from a decomposition of substance. No matter what the use, a current cannot be borrowed from nature to operate with. A perfectly independent operation of the two currents is performed, and without the slightest interference with each other's work, unless a particular purpose is to be accomplished by it. A current obtained by the operations of a galvanic battery or a dynamo is given a particular work to perform. It is always obeying its office, and it cannot be given another office to perform. A current generated by a battery will do only a decomposing of substance and placing its parts where they are most appropriate.

A current generated by water will only operate in water. A current generated by a fire will operate only in a fire. A current generated by a substance of natural decomposition will only assist in decomposing substances in a natural way. A current generated by a plant while it is living will only assist in the growth of plants. A current generated in a body of a creature will only assist in constructing cells and performing the operations of the body. A current generated in a fold of a brain will perform only a particular intellectual work. A current in a nerve will perform only a power in such organ. A current in an ocean will only whirl water of the ocean. A current in a tide will actually cross one in a sweeping current of water of the ocean and without in the least disturbing the velocity of the water. The current a world discharges will only construct hills and plants, and hold objects on the surface of the earth. A current of the sky is only creating heat and light for the earth. And in every operation of a current of electricity a particular work is performed, and it is of no consequence whatever whether another current is operating in the same place at the same time.

TO DEVELOP THE LUNGS.—If a person's lungs are not well developed, the health will be imperfect, but the development may be increased several inches in a few months by daily outdoor runnings with the mouth closed, beginning with 20 yards and back, at a time, increasing 10 yards every week, until 100 are gone over thrice a day. A substitute for ladies and persons in cities is running upstairs with the mouth closed, which compels very deep inspirations, in a natural way, at the end of the journey.

INTENSE COLD NECESSARY FOR SOME FORMS OF VEGETABLE LIFE.—A marine alga of the Arctic regions grows at a temperature far below zero, and its spores disappear at a higher temperature. It thus appears that intense cold is necessary to the existence of some forms of vegetable life, together with extreme dryness, and this class of plants probably include the cryptogams of red snow.

HEATING BY ELECTRICITY.—Among the late French novelties is an electrical heating stove. In it the conducting wires are led through apertures in plates of refractory clay and plumbago, in which wire hobbins are placed as part of the electric circuit. The hobbins are heated by the passage of the current, and in turn heat the air which is allowed to pass freely through the apparatus.

FORCE IN HEAT.—The amount of force exerted by heat and cold in expansion and contraction of metal is equal to that which would be required to stretch or compress it to the same extent by mechanical means.

VARIETIES OF THE LILY.—Up to the present time 71 species of lilies have become known, according to an English botanist, H. Elwes.

Amending the Patent Laws.

There is a bill pending in the House of Representatives at Washington, providing for such an amendment of the patent laws, that no suit for infringements of a patent can be brought in any Federal Court unless the amount involved or damage alleged to have been sustained exceeds \$200. The pretended purpose of this bill is the protection of farmers and others who are innocent purchasers of goods which infringe the right of patentees. The passage of laws for the prevention of frauds is, of course, desirable, but legislators are in duty bound to see that in attempting to redress one class of wrongs, other wrongs may not be perpetrated. The sole purpose of patents is the encouragement of inventions calculated to promote the general good. The inventor is ordinarily poor. His mind is more or less in the realm of the ideal. His brain evolves a mechanical principle. His hands fashion what his brain evolves. What was inspiration becomes to him demonstration. To the perfection of his mechanical creation he devotes time, labor, money; he sacrifices personal comforts and social enjoyment; and sometimes he is brought face to face with possible starvation. For the protection of mechanical property thus created, all civilized governments have enacted patent laws. The Government of the United States has been especially watchful in the interest of the inventor. It has thrown about him theegis of its protection. It grants him exclusive proprietorship in his mechanical idea for a period of 17 years. Why should there be any letting down in governmental guardianship of his rights? A patented article worth less than \$200 may be just as valuable, relatively, to the inventor as one worth \$50,000 to some other inventor. If any class has been victimized by purchasing illegally manufactured goods, the fault can probably be traced to their own neglect. All patents are publicly recorded. The presumption of the law is that this record is known and read by all men. If it is not, the fault is not in the written and printed record.

The rules and regulations of the Patent Office have in the main operated satisfactorily. Inventors, manufacturers and consumers understand them. They should not, in any important respect, be disturbed. The proposed bill would be a radical disturbance, and is not demanded by public sentiment nor the general welfare.—*Industrial World*.

New Alaska Mines.

Some of the richest quartz we have ever seen came from the new discoveries in the Berner bay region. These discoveries are sufficiently extended to give assurances of a very extensive gold field, and the *Alaskan* will miss its guess if there be not some mines developed there which will lay way over anything of which we have present knowledge—which will severally outdo even the great mine on Douglas island in the value of their output. A large number of claims have been taken up, and there is a reasonable certainty of one or more mills being erected the coming summer. The development of this new district, together with the opening of new mines and erection of new mills on Douglas island, is destined to make Juneau one of the richest and most prosperous mining towns in the United States. Indeed the place can no longer be regarded as a mere mining camp. It is taking on the airs and improvements of a full-fledged city; new buildings, and of a much better class, are going up in all directions, water-works which afford an abundance of pure water for domestic use, and also for protection against fire, have been put in, and altogether Alaska's commercial and mining metropolis wears an air of solid wealth and growing prosperity which argues well for a glorious future. The town bids fair to more than double its population within the coming year, and should the mining interests of which it is the center develop even in a fractional ratio of what may fairly be expected of them, it won't be long till she numbers her people by as many thousands as she now has hundreds.—*Alaskan*.

OUR EXTENSIVE DEPOSITS of bituminous limestone, it is expected, will be largely utilized at no distant date. Experiments with the material have proved that it will be a formidable rival of cement and artificial stone in the innumerable uses to which those materials are put. It seems specially adapted for sewer pipe, possessing great tenacity and durability, and for reservoirs, cellar and warehouse floors, sidewalks and the like it would have no superior. The deposits are said to be very extensive and easily developed and the material is worked with great facility. We hope to see this a prominent industry of the county.—*San Luis Obispo Tribune*.

The new mill recently erected, about four miles east of the Mountain House, by Messrs. Cowan, Crisler and Decker, of Carson, has been closed down for the winter. The mine, however, will be worked, and operations at the mill will probably be resumed early in the spring. It is understood that the ore worked at the recent run paid well.

At Pratt's South Camp, near Wellington, Douglas county, Nev., says the *Genoa Courier*, Pratt's two-stamp mill commenced crushing ore about two weeks ago, but on account of the severity of the weather, the water pipes having been frozen up, causing considerable delay, no important cleanup has yet been made.

USEFUL INFORMATION.

Distilling Slops for Vine Dressing.

We clip the following interesting information in regard to an economical use of distilling slops from the *St. Heloa Times*.—We witnessed the other day at a prominent distillery near this town the utilization of distillery slops, namely, the process of extracting the argols contained therein, from which cream of tartar is manufactured. So far, we understand, this valuable refuse of the distillery has been allowed to find its way through the gutter to the creek, not even has it been used as a fertilizer, notwithstanding the fact that it contains the sum and substance found in the vine and its fruit.

The proprietor, who is bound to find out whether or not it will pay to utilize distillery slops as stated, now makes a trial to that end, keeping a strict account of all labor spent until the argols are all ready for the market. It requires no investment of capital, inasmuch as all tanks and other utensils used are always on hand at a distillery or cellar.

The process of crystallization is as follows: The liquid in question, which constitutes the residue of the wine sediment or piquet after all spirits have been extracted, is led, hot, into low tanks in which a number of grain sacks, cut in two lengthwise, are vertically placed, fastened above to a rope or a rod to keep them in that position. During cooling of the liquid the process of crystallization goes on, the argols forming themselves and accumulate on the sacks placed there for the purpose.

Another way, in place of sacks, to facilitate crystallization, is to use brush, which is put in the tank in bundles. When the process is over the crystals are freed therefrom by shaking, while the sacks have to be scraped and washed in water. The brush is used to advantage because the more surface is obtained on which the crystals settle—it also saves labor. The liquid now remaining is a good fertilizer. We were convinced of the fact when the proprietor showed us a tract of land in his vineyard where these slops had been applied, there was a rich vegetation, while not far from there, where it had not been applied, no vegetation to speak of had shown itself.

RESTORING LEATHER BINDINGS.—Mildew, which shows itself in the form of roundish or irregular brown spots, cannot be cured, but its development may be effectually checked by thoroughly drying the volume and afterward keeping it away from damp. In many cases the leather bindings of old books will be found to be dilapidated. Should they be broken, rubbed or decayed, plaster the part with paste to fill the crevices; then take the yolk of an egg, heat it with a fork, and apply it to the leather with a sponge, having first cleansed it with a dry cloth. To produce a polish surface, a hot iron must be passed over it. If it should be found advisable to remove stains of any kind from the interior or exterior of a book, observe that in the case of common writing ink, the best purifier is a mixture of spirits of salt and water in the proportion of one to six. A solution of chloride of lime is also good, and in both cases the part should subsequently be well washed with clean water. Grease or wax spots are easily removed, either by direct evaporation, which is accomplished by holding a hot iron close to the place affected, or by washing it with ether or benzine. To complete the latter process it is advisable to use the iron as in the former instance. The remedy against oil stains is sulphuric ether. If the stains are extensive, roll up the leaf to be operated on and insert it in a flat-mouthed bottle, half full of the ether, and shake it quietly up and down for a brief period. On removal, the stains will have vanished, the ether rapidly evaporates from the paper, and a little clear water is then all that is required.—*From Book Lore*.

BREAD BAKED BY BOILING.—A writer in a housekeeping journal says: Bread can be boiled instead of baking it, and with far less heating of the range. Those who have tried the new method consider it to be quite satisfactory. It consists mainly in steaming the dough instead of cooking it in the oven. It is claimed that this is a great invention, as it saves the time and experience necessary to get the oven to the right heat for baking, which has always proved the great obstacle to baking at home. The utensils required are simply these: First, a tin mold, or camp-kettle, in which the dough is placed after it has been mixed with the usual ingredients—water, yeast, sugar and salt—and, secondly, a larger tin saucepan, into which the mold fits. The water in the outer saucepan is allowed to boil around the tin mold for two or three hours, the lids of both utensils being kept closely down, and at the end of that time the loaf may be turned out. It will be found firm, solid and pliable, with all the qualities of good bread.

THE USE OF SNAKES.—Persons who dislike snakes, says the *New Orleans Picayune*, continually ask: "What is the use of them?" That they are not without use will, I hope, appear in the course of this work, were it necessary to preach that all things have their use. But in one habit that offended Lord Bacon, namely, of "going on their belly," lies one of their greatest uses, because that, together with their internal formation and external covering, enables them to penetrate where no larger car-

nivorous animal could venture, into dark and noisome morasses, bog jungles, swamps, amid the vegetation of the tropics, where swarms of the lesser reptiles, on which so many of them feed, would otherwise outbalance the harmony of nature, die and produce pestilence. Wonderfully and exquisitely constructed for their habits, they are able to exist where the higher animals are not, and while they help to clear those inaccessible places of the lesser vermin, they, themselves, supply food for a number of smaller mammals, which, with many carnivorous birds, devour vast numbers of young snakes. The hedgehog, weasel, ichneumon, rat, peccary, badger, hog, goat, and an immense number of birds keep snakes within due limits, while the latter perform their part among the grain-devouring and herbivorous lesser creatures. Thus beautifully is the balance of nature maintained.

POLISHING TOOL HANDLES.—The wooden parts of tools, such as the stocks of planes and handles of chisels, are often made to have a nice appearance by French polishing; but this adds nothing to their durability. A much better plan is to let them soak in linseed oil for a week, and rub with a new cloth for a few minutes every day for a week or two. This produces a beautiful surface, and at the same time exerts a solidifying and preservative action on the wood.

TO RETAIN STARCH IN CLOTHES.—It may not be generally known that after clothes are starched in the usual manner, if they are passed through a bath of chloride of zinc heated to about 60°, the starch will be held through several successive washings and will suffer no change by being exposed to the dew or rain.

CARBOLIC ACID is now recommended for moistening the tools with which metals are worked. The efficiency of the grindstone is even said to be increased by the use of acid. The dark and impure acid can be used for this purpose.

TO TAKE PAINT SPOTS OFF OF WOOD, lay a thick coating of lime and soda mixed together over it, letting it stay 24 hours; then wash off with warm water, and the spot will have disappeared.

THE demand for tubing and piping for natural-gas purposes is so heavy that prices have been advanced.

GOOD HEALTH.

Carriers of Contagion.

How Poisonous Particles are Carried from Place to Place.

To mention a few of the modes of contagion, I have to speak, in the first place, of towels, especially of that abominable institution known as the roller-towel, which has been used so much in asylums where 40, 50, or more children use the same towel, whether they have granular lids or not. True, in a great many of these cases the existence of granular lids was not known; but even in cases in which the existence of the disease was evident, the ignorance or carelessness of the persons in charge has allowed transmission by towels to be one of the most frequent sources of contagion. As a carrier of the contagion the housefly plays an important role, especially in cases of young children who are not able to protect themselves against the visits of this little animal. Attracted by the sweetish odor of the discharge, it will settle on the eyes of children affected with the disease, especially infants, and carry the contagion in its claws to the other eye or to the eyes of sleeping infants.

Spectacles may be the carrier of the contagion. I remember the case of a young lady who could not explain satisfactorily how she came to have granular lids. Upon her return to school she mentioned that she had granular lids, whereupon one of her classmates said: "Why, that is the disease which I have been suffering from for the last six months." This classmate was near-sighted, and used glasses. My patient was also near-sighted, but had not used glasses, and whenever she wanted to see anything at a distance she was in the habit of borrowing the spectacles of her friend, and there is no doubt in my mind that this was the means of carrying the poison from the classmate's eye to the patient's eye.

Children with granular lids are very apt to rub the eyes, because the secretion as it begins to dry on the edge of the lids causes an irritating, itching sensation. They will now play with other children, and from their hands transfer the poison to the hands of the other children, and these latter rubbing their eyes contract the disease. Handling objects which have been used by granular-lids patients may be the means of carrying the contagion. A young lady who volunteered to teach children affected with granular lids, and who had been isolated from other children in a certain institution, was warned to be extremely careful with regard to using handkerchiefs, towels, or anything which belonged to the children. She was well aware of the danger, and promised to be very careful. She handled nothing whatever, she said, that belonged to the children, left her cloaks outside, and in the classroom kept away from the children a distance of five or six feet. But upon examination of her eyes, 14 days after she had taken office, it was found that she began to suffer from granular lids. Upon inquiry I found

that she had been taking the copybooks and slates of the children for correction, and in all probability she got the poison from the slates and books on her hands and then conveyed it to her eyes. A teacher of another section in the same institution was more careful; she simply walked into the classroom, did not touch anything belonging to the children, and for two or three months, during the duration of this epidemic, she was not affected by the disease. The atmosphere had evidently not been the carrier of the contagion in the first case.—*Medical Reporter*.

Whooping Cough—What Is It?

Whooping cough is a highly contagious fever, affecting the entire system, but specially manifesting itself in an inflammation of the bronchial tubes and a spasmodic cough occurring in frequent paroxysms. The whoop is due to the rapid coughing. This renders it impossible to draw in the breath until the coughing ends, when the breath enters strongly through the glottis, still partially contracted by the spasm. It rarely ends in less than six weeks; generally its run is longer, sometimes many months. As a rule, the physician merely aims to palliate the symptoms, guard against complications and abridge somewhat the attack. Says Flint: "It must be admitted that there are no means by which the affection may be arrested."

A writer in the *Lancet* for March, 1886, thinks that the prevalent treatment has been directed too much to the symptoms, instead of to the cause. Hence the medicines prescribed have simply had an anti-spasmodic and sedative effect—relieving the cough, but not reaching the disease itself. During a severe epidemic of whooping cough, he noticed, on several occasions, a marked alleviation of the symptoms, and then at other times a marked aggravation. This led him to suspect some powerful atmospheric influence at work. On consulting his charts, he found that the former condition corresponded to a high percentage of ozone in the air, and the latter to a very low percentage. Ozone being a natural antiseptic (preventive of putrefaction), he at once commenced to treat his patients with antiseptic medicines, taken internally. The result was very favorable. The method was confirmed by further experience, proving satisfactory in almost every case.

THE GASTRONOMIC VALUE OF ODORS.—The magic and value of gastronomic odors lie in this, that they stimulate the flow of saliva and other alimentary juices, thus making sure that the food eaten will be thoroughly utilized in renovating the system. This stimulating effect of gastronomic odors also explains the French saying that the appetite comes while eating, as well as our habit of reserving sweetmeats, nuts, cheese, etc., for the end of a meal, when rich odors are needed to brace up the flagging appetite. So great and salubrious is the effect of gastronomic odors in stimulating all the glands and functions of the body, that a dinner of savory, fragrant courses may produce in the diner a feeling of warmth and exhilaration resembling the effects of wine, but with none of the depressing after-effects following excessive indulgence in that liquor. And thus it comes about that the epicure in search of "ignoble pleasure" finds it the source of health and of general contentment with the world.

CARBOLIC ACID IN INDIGESTION.—In a recent number of the *Practitioner and Nurse*, a correspondent says: "I have just passed through a severe attack of indigestion accompanied by colic, pyrosis, food eructations, epigastric weight, uneasiness, etc. Alkalies, muriatic acid, pepsin and pancreatic extract failed to give relief. Seeing your note in the *American Practitioner*, on the use of carbolio acid in acid eructations, etc., I took, with almost instant relief, two or three drops of the acid as soon after food as regurgitation, distention or acidity occurred. One dose was usually sufficient. On two occasions only was a second dose required. This I took half an hour after the first. I dropped the acid on a bit of fresh bread and rolled the mass into a pill. Since my own case I have given it in a similar case, with like good result. Here I added a scruple of carbolio acid to one ounce of glycerine. Dose, a teaspoonful."

NEW HELP IN SURGERY.—According to the statement made by Professor Bonafoux, a powder composed of equal parts of colophony, carbon, and gum arabic possesses a very great degree of hæmostatic power, and is capable, it is said, of so arresting the bleeding of large arteries as to prove decidedly serviceable in important surgical operations. The first experiments made by Professor Bonafoux with this composition were on the brachial artery in man, and on the smaller vessels, on the carotid of the horse, and other vessels of the same animal—all of these being attended with marked success.—*London Lancet*.

BLOOD POISONING FROM MACHINE OIL.—Take care, says *Power and Transmission*, how you let any machine oil or lubricator come in contact with a cut or scratch on your hand or arm, as serious blood poisoning may result. In the manufacture of some of these machine oils, fat from diseased and decomposed animals is used. All physicians know how poisonous such matter is. The only safeguard is not to let any spot where the skin is broken be touched by any machine oil or lubricator.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MISCELLANEOUS.—Amador Ledger, Feb. 5: J. F. Parks took charge of the Kennedy mine as superintendent on Tuesday. R. Boundy has been appointed foreman of the Keystone, the place vacated by Mr. Parks. The attachment of the Quartz Mountain mine has been released, and the mill resumed operations last Monday. Mr. Graham, one of the owners, is up from the city, looking into the affairs. All who claim to be posted have the utmost confidence in the paying nature of this property if fairly managed. As the immense mountain of quartz is big with promise of future prosperity to that part of the county, it is hoped that the bright prospects will not be marred by injudicious management. T. H. Goodman has sold his mine at Quartz Mountain, and a ten-stamp mill is being erected by the purchasers thereon. A dwelling-house is also being erected.

SUTTER CREEK.—Cor. Ledger, Feb. 5: C. E. Fournier, the contractor for the Wildman hoisting works, is getting along nicely with his job. He has got some of the framework up, and the shafts will be in position in a few days. The work next in order for the carpenters will be to put a building over the shaft. Mr. Fournier is doing most of the work himself, with one or two helpers. Knight & Co. are getting along with the pipe, and digging the ditch for laying the same will be commenced in a few days. G. W. Horn has about a half dozen men at work at the Maboney, getting rock out and filling all the dumps preparatory to starting the mill, which he expects to get in motion next week.

PLYMOUTH.—Amador Sentinel, Feb. 5: Quite a little boom has struck Plymouth in the way of mining excitement, and quite a number of claims have been located in the last few days. Mr. Geo. Claich, the owner of the Red Cloud mine, situated on the Pre-emption claim of E. S. Hall, has hauled and had crushed several tons of rock at the D. D. Reeves mill. He realized \$12 per ton in free gold, and the sulphurets were assayed by Messrs. Barney & Voorhies, of Sutter creek, and gave a return of \$180.32. The extension on the north of Claich was taken up by Peter Pretrunivich on the 29th of January, and duly recorded according to law, and active operations commenced. This claim is called the New Pacific, and the owner is getting first-rate prospects. Nick Ventich has located the New Eureka on the south extension of the Red Cloud. He says that he has had his eye on the place for the last 20 years, and never had a chance to get hold of it until now. All of the new locators agree in saying that this new ledge of quartz is on the same range as Amador City. All of the old stand-by working mines are pounding away, with good results as usual. In less than one year Plymouth will have eight or nine mills working, paying ore to the tune of \$2 or \$15 per ton, and no mistake. Dr. A. C. Smith is busy just now moving machinery to his mine near Nashville in El Dorado county. The doctor has some fine-looking ore on exhibition.

Calaveras.

ANGELS MINING CIRCLE.—Mountain Echo, Feb. 3: There has never been a time in the history of Angels that the quartz-mining interests looked more favorable and encouraging than at present. Mining men are frequently making their appearance among us, eager to purchase mining property. Thus far, all who have visited this locality have been favorably impressed with the mining interests. Prospectors are active, and numerous valuable discoveries have recently been made. The Stickle mine is making an excellent showing under its present management. Everything is running in full blast, with good results. On the 400-foot level, in the stopes running north, an immense body of good milling ore has been developed. Work on the other levels is progressing with considerable vim; the ore which is being extracted yields profitable returns for the expense of mining and milling. The mill is kept in constant motion, and everything in and about the mine and mill seems to work like a charm, so well are things arranged and managed. Mr. D. P. Pierce is the superintendent. The Utica mine is constantly in operation, and judging from exterior surroundings, prosperity evidently prevails. The ore which is now being mined is pronounced good milling ore. We are informed that an abundance of this grade of ore is in sight. The battery plates present a healthy appearance. Mr. Chas. Lane, the superintendent, is deserving of much credit for his energy in developing the mining interests of this section. The Marshall mill in this town is now engaged in crushing and concentrating the ore which is being hauled from the Jones mine, south of this place. Two hundred tons of the ore is being put through the batteries as an experiment. Several samples of the concentrations have been sent to San Francisco, none of which assayed less than \$1500 a ton; some going as high as \$2000 a ton. The Jones mine is destined to be one of the richest silver-producing mines on the Pacific Coast. Work will soon be commenced on this mine on an active and extensive scale.

THE LINDSAY MINE. owned in part by B. R. Prince, of Altaville, is situated within a mile of this town. It is being rapidly developed under present management, and is said by competent judges to be one of the richest mines in the country. It is the general impression of mining experts that it is located on the mother lode, which they say greatly enhances the value of a mine. About four years ago John Lindsay took charge of the property, and under his management the mine has increased fourfold in value. John thoroughly understands quartz mining and how to make it pay. He is one of the best timbermen in the county. A visit to the mine will convince the most skeptical of this fact. Recently several representatives of an English syndicate visited and inspected the mine with a view of buying it. The Tozer mine is in operation also. The Lowe crusher, better known as the "cannon-ball" mill, is running constantly, but with what success we could not ascertain. Other minor ledges are being worked throughout this section, the ore of which is principally crushed by the arastra process, many yielding satisfactorily.

WEST POINT.—Calaveras Chronicle, Feb. 5: Our

mines are moving quietly onward. The Lockwood has about 50 men employed. The Keltz mine is running a force of 20 men. The Star of the West mine and mill are both running. The Scorpion whistle keeps the West Pointers on time. The Water Lily mine is closed down at present.

Contra Costa.

THE DIABLO MINES.—Contra Costa Gazette, Feb. 5: Numerous mining claims have been located on Mount Diablo since the first public announcement, a month ago, of Mr. Stevens' discovery of a gold ledge on the side of Mitchell canyon, above Clayton. A number of men are engaged in prospecting, and it is to be hoped that the main ledge so far discovered will be opened up sufficiently to give it a thorough test. Twenty-three years ago a gentleman residing in Clayton sent specimens of ore from Mount Diablo to San Francisco to be assayed, and the rock held \$12 in silver and \$3 in gold to the ton. Last week the same gentleman sent some ore from the same ledge to the Selby smelting works in this county, which assayed \$10 in silver to the ton and showed a trace of gold. Good milling ore of this quality will pay handsomely to work, if found in sufficient quantity; if, however, the ore is refractory, it would cost all there is in it to work it. The mining district has not yet been permanently organized.

El Dorado.

LINCOLN.—Georgetown Gazette, Feb. 5: Work on the Lincoln mine is being carried on as rapidly as possible, and the general opinion seems to be that the Lincoln is a good mine. Superintendent Keefe is stopping at the mine and giving it all his attention. He has good men employed. Will and George Myers are working on the Wildwood mine on Rock Canyon. G. Sneder, the owner, thinks he will erect a mill when the mine is properly developed. We understand that work is progressing favorably on the St. John mine. The parties who are working the mine are evidently there to stay.

Fresno.

FINE GOLD NOTES.—Hilthre Miner, Feb. 5: The company from Santa Rosa who have bought one-half of the James & Francis mine have started to enlarge the working shaft. While leveling off the surface for the boilers, specimens of gold quartz were uncovered. The company is making extensive preparations to open the mine on a large scale. The McNally mine is looking well in the numerous drifts being opened up in ore. The ledge in the shaft improves in size, and holds its own in value as more depth is attained. The Last Chance mine shows up a strong two-foot ledge of ore in the east drift and a one and one-half foot ledge in the shaft of ore that mills from \$20 to \$25 per ton, and of good quality of milling quartz. Their ore dump contains about 60 tons of ore. The Hampton mine is located on the southwest side of Crooks' mountains, having a two-foot ledge in the upper shaft that is very rich. The ledge is alive with coarse gold. Mr. Hampton is drifting on the ledge in the tunnel 80 feet below the upper shaft. The tunnel is in over 400 feet. P. Dowling, Neil Nevens and Chas. Taylor have leased the Fleming mine with the agreement to sink 100 feet and drift 200 for one-half of the ore. The Hanover mill started crushing ore Thursday from the Hanover mine. Mr. H. S. Williams, the owner, arrived from Madera for the purpose of starting work on the mine. The White Bear mine has opened up a high-grade body of ore in size from wall to wall, including two clay selvages, of two and a half feet of quartz at a depth of 55 feet. The ore prospects to the pan (20 lbs.) \$80 per ton coarse gold; the sulphurets are very rich. The boys working upon the Fresno prospects uncovered rock in the ledge that is exceedingly rich. The ledge is one and one-half feet from wall to wall, incased in a sedimentary formation. The gangue is clay and talc that prospects from \$8 to \$10 to the pan. The boys who have leased the Fleming mine are down 65 feet upon a good two-foot ledge that arastras fully \$30 to the ton (in place), but will average at least \$20 all through. The Hilthre mine has been started up, with Mr. Wallace as superintendent and manager, who has a force of miners at work, making surface improvements. The depth of the working shaft is 312 feet. From being filled with water since Mr. Hilthre's death, the entire shaft will have to be re-timbered. The ledge is small (two-foot) but very rich in places; in three east drifts, and in the shaft, the ore will average \$65 milling value. The Santa Rosa Co., which has bought one-half interest in the James & Francis mine, has just received its boilers and hoisting works from the foundry in San Francisco. The Wilson mine is one of the best mining propositions to buy in this section. The owner is at a depth (incline) of 75 feet in the ledge, which is two feet in the sump of very high-grade ore; without the sulphurets, the entire ledge and talc selvage will mill \$80 per ton. The sulphurets assay \$350 per ton. The returns received by arastra was \$62 per ton. Messrs. Reed, Harris & Co. have recently opened up a very promising new mine on Pine Gold, which they have named the Lottie K. They have drifted some 60 feet on the ledge, and have found, along the entire distance, a well-defined ledge some 22 inches thick. The quartz is of a decomposed quality, and is fine milling ore. They have worked a considerable amount of the vein matter, and have been rewarded with an average yield of over \$80 per ton. The Red Mountain mine is judged as a good mining proposition. Its present depth is 60 feet upon a ledge of two feet of high-grade ore and three feet of ledge matter that prospects in coarse gold.

Inyo.

RICH STRIKE REPORTED.—Independent, Feb. 5: It is reported from Darwin that a large and rich ore body has been struck in the extension of the Defiance mine. George Lewis is the lucky prospector. The ore body is reported to be very large and the ore of good quality.

SAN CARLOS.—The San Carlos mine appears to be developing well. Very recently C. Hoole and his comrade made a shipment of ore from the mine, and now they have another lot ready for shipment.

Mariposa.

THE HITE'S COVE MINE.—Gazette, Feb. 5: The news from Hite's Cove is quite favorable. W. W. Hunter, who was employed to put in repair the air compressor, has finished the job, and the water in the shaft and mine is all pumped out. It only requires about two hours a day to keep the mine clear of water. Sam Tippet has taken a contract to drift 100 feet easterly on the lower level. A 60-foot

drift below the main tunnel level has just been completed. At present there are only 20 men employed. Judge Walker, who has charge of the mine, is below and is expected up, probably to-day. It is said he will be accompanied by the grand expert of the foreign company of capitalists, upon whose decision the fate of Hite's Cove for the near future depends. As represented to us, Judge Walker has simply put the mine in condition for inspection by the company's representative.

BUENA VISTA MINE.—We are informed that this mine has passed into new hands, with Mr. San Pedro, the celebrated expert at mining, at the head of the management. The sale was effectively concluded on Wednesday last, and Mr. San Pedro has gone below to purchase a new engine, boiler, pump, and rock-crusher. The main shaft is to be sunk 100 feet deeper, which, no doubt, will open out a fine body of ore. The Sherlock mining district, which comprises Whitlocks, Saxtons, Mono and Bear Creek, is fast coming to the front. During the last three or four months there have been a hundred or two strangers moved into that section. There is a small colony of a dozen persons or more from Oakland, including a couple of families lately moved in. The mining boom for that section has just commenced. From one to ten thousand dollar pockets have been found here within the last year.

Mono.

A RICH STRIKE.—Bodie Miner, Feb. 3: A. E. Bean, one of the co-owners of the Rattlesnake mine, who came in yesterday from the once famous Monocville, reports that very encouraging prospects have been encountered in the Rattlesnake mine within the last few days. There are two incline shafts sunk on the ledge. The north shaft has been sunk to the depth of 150 feet. From the bottom of this shaft a drift has been run north on the ledge. All the ore from this drift has been of a high grade, but at the distance of 35 feet from the shaft a deposit of exceedingly rich ore was struck. The vein in this drift is from 10 to 20 inches wide, and average assays from this point go as high as \$4000 to \$5000 per ton. Mr. Bean showed the Miner reporter several pieces that he had with him, which, to use a homely expression, were "perfectly lousy" with shining specks of gold; many of them apparently as big as peas. How extensive this deposit is, the owners cannot say, but it makes them feel mighty good for the time being. Ore from the southern portion of the mine, worked by arastra process, has paid from \$22 to \$45 per ton, and some assays from the central part have gone up into the hundreds of dollars per ton. From these workings it would seem that the northern portion of the mine is the richest part.

SWEETWATER MINES.—Esmeralda News, Feb. 5: A. Kilpatrick returned from Chicago last Wednesday, accompanied by W. W. Watson and J. W. Berlin, the latter two gentlemen representing Chicago parties, and are here for the purpose of examining the Monte Cristo group of gold mines, which are situated at Frying Pan, Patterson district, Mono county, California, and about four miles from Henry Williams' ranch, on Sweetwater, Esmeralda county, Nevada. This series of mines, five in number, were discovered nearly two years ago, since which time some work has been done tunneling and crosscutting the ledges. The present owners, Messrs. Kilpatrick, McCurdy, Cameron, Vansickle and Patterson, extracted considerable ore and milled 160 tons thereof which worked over \$18 per ton in gold. The ledges are of immense size and the ore free milling, averaging about \$12 per ton. In one mine a crosscut was run through the ledge, which proved it to be 35 feet wide. There is every facility for the cheap working of the ore, wood and water being abundant. If the report of Messrs. Watson and Berlin is favorable there is no doubt but that a sale of this property will be promptly consummated.

Nevada.

TEMPORARY SUSPENSION OF WORK.—Foothill Tidings, Feb. 7: The only serious drawback in this vicinity, arising from the storm, is the suspension of work at the Idaho, Empire, Badger and Crown Point mines. This is caused by the clogging by snow and consequent breakage of the South Yuba water ditch, away up in the mountains. This ditch supplies the mines mentioned with the water used as motive power. The ditch is supposed to have broken on Thursday night last, and as far as known, has not yet been repaired, but every effort to that end is being made. At the mines mentioned all work has ceased, save that the pumps are kept in operation, the steam connections having been started up at the Idaho and Empire. Water is being gathered from here and there to run the Badger pump, and it is expected that no difficulty will be experienced in so doing. The Crown Point pump is kept in operation by water from Wolf creek. Until the ditch is cleaned and repaired, no underground work can be done at the mines mentioned. The probability is, however, that the snow embargo will be quickly raised and work resumed in a day or so.

PLANET DRIFT GRAVEL MINE.—Grass Valley Union, Feb. 6: Wm. Keskeys, foreman of the Planet Drift gravel mine, on Lowell hill, this county, writes to M. Byrne, Jr., that the gravel is improving, and that the gold obtained from a recent cleanup was much coarser than any ever taken out before, ranging in pieces from one dollar up to eight. Some time ago the drifters struck a strong body of water, and they are now following upstream on this water, which will doubtless lead to the main channel, as indicated by the coarse gold just cleaned up.

MINES AROUND OMEGA.—Cor. Nevada Transcript: The gravel deposits on Diamond creek are being pretty thoroughly prospected this winter. Six companies are at work almost within a stone's throw of each other. E. E. Matteson & Co. are located on the north fork of the creek. They are running a tunnel into the hill to strike an old river channel that is known to exist there. Both below and above this point, large nuggets of gold have been frequently found. The old Lawrence claims have been leased to Chinamen, and are being worked by hydraulic process. They depend entirely on free water from Sawmill Flat, but they have had very little so far. Old man Merrill and his company are cleaning out and retimbering an old 180-foot tunnel on the Chase and Sanders ground preparatory to extending it into the hill further for prospecting purposes. The Hunken boys, John and Nick, are working on the opposite or south side of the creek. Their claims are pretty well opened, and it is supposed that they are receiving fair returns for the amount

of labor performed. Next above come the claims owned by John Dill. His ground is also well developed. Three men are at work drifting and breasting out. It is somewhat spotted on the hed-rock, but on an average it pays very fair wages for the times. The adjoining claim above Dill's is owned by a Salt Lake company, which has started a tunnel into the hill to prospect the ground above the Omega ditch, and early in the spring the work of pushing the tunnel ahead will be prosecuted with vigor. F. Fritzmyer is the company's superintendent. In quartz there is nothing doing, although there are some good-looking ledges around the head of the creek. The output of hulkion from this section may astonish the natives some day in the near future yet.

Placer.

GOLD RUN.—Cor. Placer Argus, Feb. 5: Within the last six months considerable activity has been manifested in the direction of quartz mining, and at the present time three mines are in good stages of development. The Big Blue, located four miles southeast of town, has a ledge 11 feet wide, and gives splendid prospects. Work is being pushed rapidly, and by spring will be in good working order. The proprietors are Jas. Stuart, Burt Moody, and C. E. Brown. The Live Oak, located a quarter of a mile from town, has been developed to a depth of 290 feet, has a ledge 10 feet wide, and, without doubt, will be a good mine. S. J. Jordan is the prime mover. J. Y. Thomas has been obtaining very satisfactory returns from the Never Sweat. This is a gravel claim and bids fair to be as good as the best of those on the Forest Hill divide. So that after all, while the residents of Gold Run will probably never again be disturbed by the musical roar of the "giants," the no less pleasing sound—to a miner's ears—of the rattle of the stamps may take its place.

Plumas.

CRESCENT MINE.—Greenville Bulletin, Feb. 2: For several months past work has been steadily progressing in and about the Crescent mine under the superintendency of Mr. A. W. Whitney. In years gone by, the Crescent mine produced a great deal of money, and was more beneficial to Indian valley than most any other mine operated in or near it, for in the working of the mine a great many men were employed, all of whom received fair wages regularly. A great deal of farm and dairy produce was consumed, for which cash was paid, thus assisting materially in giving the farmer and the dairyman a good market. The reopening of this mine, therefore, has been looked forward to with much interest. In the future, however, the mine will be worked with less expense, considering the work accomplished, than in former years. Steam-power has been dispensed with and water-powered instead. Furthermore, the company owns water privileges, which afford ample power to run the pump, hoisting works and the mill. This in itself will be a great saving. Immediately upon taking charge of the mine, Mr. Whitney, who is a quiet, careful and economical superintendent, prepared to sink the main shaft. This policy has been adhered to, and the work has progressed very favorably. Since the resumption of work, the shaft has been sunk 102 feet, making the total depth 180 feet. Most of the distance, 102 feet, was through "blue curly," and that of a very hard character. Sinking will continue. A very excellent feature about this mine is that the employees and other creditors are paid promptly at the end of each month.

A GOOD STRIKE.—About two weeks ago Henry Patten, an experienced quartz miner, started a tunnel in Ohio Point, just above the mouth of Rush creek, for the purpose of prospecting the extension of the Rich Gulch ledge. He did not run but a few feet before he struck a wonderful rich seam of quartz. The point was stripped years ago by the hydraulic process, leaving the ledge bare for several hundred feet. The ledge at this point is about 40 feet wide and the expense of getting out the rock is trifling. There is abundant water-power to run any number of stamps. Thos. Hughes, of Meadow valley, and Mr. Patten, are the lucky owners. A mining company is being formed to flume the river at Soda bar next summer. It ought to pay. Report says that a company of Chinamen at work on the East branch found a three-hundred-dollar chunk one day last week.

San Diego.

COAL-BEDS AT ELSINORE.—Los Angeles Times, Feb. 5: John D. Hoff, the fortunate discoverer of the extensive coal deposits at Elsinore, was in the city yesterday on his way home from San Francisco, where he has been to buy a plant for mining. While North he had his coal thoroughly tested by experts. It showed up better on analysis than the Seattle coal which is being shipped into San Francisco by the cargo. The Elsinore coal gives 10 per cent of ash, and the Seattle coal 18 per cent. The Elsinore article contains 41 per cent of inflammable gases, as against 33 per cent for the Seattle article. The Elsinore coal is a true lignite, of the same formation as the favorite Gallup coal, and Mr. Hoff, who has investigated the Gallup mines carefully, is satisfied that he has a better article. He is in partnership with John Dolbeer, a well-known San Francisco capitalist, and they control 400 acres of coal land, the present vein being 4 feet thick. The plant which Mr. Hoff has just purchased will enable them to mine 200 tons daily, and they promise to have their coal on the market within 60 days. The plant is to be shipped from San Francisco to-day or to-morrow. Mr. Dolbeer will reach Elsinore in person, by Saturday. The mine is 4 miles from the California Southern railroad, and 3 miles from the lovely and growing town of Elsinore. H. B. Wilkins, general freight and passenger agent of the California Southern railroad, will visit the mine, in a few days, to see about the practicability of running a spur to it. Mr. Hoff further states that a big sewer-pipe manufacturer, of Des Moines, will engage in the manufacture of cement sewer-pipe on an extensive scale near the mine, where there is a vast deposit of the best clay. The clay of Elsinore has become widely famous. The opening of extensive beds of good coal, in San Diego county, will be a big thing for all Southern California.

Shasta.

IRON MOUNTAIN.—Shasta County Democrat, Feb. 3: Jim Sallee continues to make bullion bricks at Iron Mountain. During the past week several small transactions of Squaw Creek mining property took place. The Cumberland Mining Co., of Bully Choop, is at work erecting its new ten-stamp

quartz mill, and will have it crushing ore by the middle of next month. Copper City people expect another boom in that camp soon. The Wintbrope Co. is at work, and it is understood that another company has bonded and about to purchase the Extra and Bully Hill mines, and commence developments on an extensive scale. An important mining enterprise has just been started in this county. In the vicinity of Jackass Flat, a region that in early days was rich in placer gold, is a streak of lava which is supposed to overlay a bed of blue gravel, supposed to be a hidden river channel. A company has been formed to sink through this flow of lava, expecting to strike the bed of blue gravel or supposed old river channel, which is expected to be rich in gold. In Nevada and Placer counties are a number of very rich drift mines in blue gravel, the leads all being capped with a flow of lava. The parties undertaking this enterprise say that the same surface indications exist here as in the rich blue gravel drift mines of Placer and Nevada counties. There shafts hundreds of feet deep were sunk through the same lava capping as found here, and several of the richest mines in the State were discovered years ago and have paid millions of dollars to the owners. The parties who have undertaken this enterprise at Jackass Flat are experienced in blue gravel drift mining, and firmly believe they will "strike it rich." If they are successful, a most important discovery will have been made.

LOWER SPRINGS MINES.—Some of the little incident happenings in the camp are interesting. Some tracing the Gem lead with a divining rod in the opposite direction from its natural source and continuation; others dragging a tape line and compass, taking up every nook of ground that can be found; while others claim more ground than their stakes and lines call for, and one man of a neighboring camp has located 22 claims for the present year. There are not 22 ledges on our side of the creek. The Eureka mine is the west extension of the Gem and is being worked by a tunnel running along on the vein so as to prospect it the entire distance of the tunnel, which is now in 54 feet, and very rich ore is encountered. The greatest depth on this vein is 18 feet; the pay chutes are going down below the level of the tunnel. Little Winnie mine is the west extension of the Eureka, located south of Middle Creek, facing Shasta, and within 12 feet of the east and west line of the Eureka, where splendid ore was taken out. The El Dorado is located west of the northwest corner of Mrs. Myres' patented land, and is a very promising looking mine. The Bulkhead and Eastern Star are fine prospects, and proper developments will make both valuable mining property.

Siskiyou.

PLACERS.—Yreka Union, Feb. 3: A very correct and clever article on our mines appears in the current issue of the MINING AND SCIENTIFIC PRESS. We take exception only to one point. Our placer mines are far from depleted. Only our shallow mines have been worked out and the move to work the deeper, and by far the most profitable, is yet in its infancy. With the advent of capital, the tide of which must necessarily be directed this way ere long, we will experience such an unearthing of wealth as the county has never known before. The era of quartz discoveries is scarcely upon us, but there can be no question but what there will be a complete revolution and vein mining will be the principal industry in time. Although Siskiyou ranks as the third greatest gold-producing county in the State, it cannot yet be said that it is even half prospected. To the capitalist and prospector alike Siskiyou opens a field for profit unequalled by any other county in the State.

Trinity.

QUARTZ DEVELOPMENTS.—*Journal*, Feb. 5: From Mr. J. W. Carter, of Hay Fork, who is in town this week, we learn that Shattuck's Huntington mill is doing good work, crushing about 15 tons per day. About 80 tons have been crushed from the Horseshoe mine, and the amalgam produced gives satisfactory results. The ore was considered to be of low grade and the result of the first crushing is certainly very flattering. This mine is now yielding a better grade of ore than at any time heretofore and the ledge is three feet wide. Rennie, Searies and Rourke have taken out about 60 tons of ore from their mine, situated at the head of Kingsbury gulch, which is estimated at from \$75 to \$100 per ton. Owing to the softness of the six miles of new road which they have built, transportation of ore to the mill has been retarded, but they will soon commence hauling steadily, arrangements having been made with Mr. Shattuck for crushing. Greenleaf and Marsh are running a tunnel on a two-foot ledge which they have recently discovered, and it prospects well. The Magdalene, on Kingsbury gulch, owned by Shattuck & Co., is showing up well, the tunnel being in over 80 feet. Messrs. Shattuck, Carter & Vogdes, owners of the Cyclone mine on Morgan gulch, have men at work taking out ore, about 60 tons having been deposited on the dump. The supply in this mine seems almost inexhaustible and the quality is highly encouraging. They will soon commence crushing, when the value of the mine can be approximately determined. Mr. Shattuck has stimulated the interest in quartz mining in that section to a high degree, for which he deserves great credit; and by the erection of a mill in that district he has enabled prospectors to give their ore a practical test.

NEW MILL.—From Mr. L. Castner, who was in town this week, we learn that the machinery for the Huntington mill to be built at the Venicia mine, Eastman district, recently sold by C. L. Blakemore to Mr. Probert, of San Francisco, arrived last Sunday. Twenty-eight thousand feet of lumber has been ordered from Mr. Jumper; the mill will be erected and put in operation as soon as possible, and another bullion-producer will advertise the quartz interests of Trinity county.

Tulare.

WHITE RIVER.—*Tulare Times*, Feb. 3: Mat Tyler, who has just arrived from the White River mines, near Tailholt, reports considerable ore being worked at the new mill there. The capacity of the mill is about 12 tons per day, and the grade of ore now being worked yields about \$25 per ton. The ore from the B. D. James mine yields \$125 per ton and upward.

QUARTZ.—Jack Shannon recently discovered a quartz mine in this vicinity. Robert Baker sent samples of the ore to San Francisco to have it as-

sayed. The following is the result per ton: Silver, \$154.83; gold, \$450. There is plenty of ore in sight.

NEVADA.

SAVAGE.—*Virginia Enterprise*, Feb. 5: 500 level—East crosscut No. 2 has been advanced 18 feet, the last 12 feet being in good ore. The station at the shaft on the 600 level has been completed, and are ready to extract ore from this level. 800 level—The south drift has been extended and timbered 25 feet. An additional distance of 80 feet will connect it with the old Savage or Curtis shaft. No. 3 west crosscut on this level has been advanced and timbered 25 feet. Most of the material in this drift is quartz carrying ore. 1640 level—East crosscut from north drift has been advanced 28 feet. The west crosscut, opposite, has been advanced 18 feet in low-grade ore. East crosscut from the south drift on this level has been advanced 25 feet, in quartz showing some ore.

OCCIDENTAL.—Upper tunnel—The south drift from the north incline winze has been extended 11 feet; total length, 103 feet. The east crosscut from the same level has been extended 7 feet; total length, 43 feet. From the north drift, same level, the west crosscut has been extended 9 feet; total length 25 feet. Lower tunnel—In No. 2 upraise, at a point 90 feet above the main tunnel, have advanced a north drift 16 feet.

GLADSTONE.—For the week ending Feb. 5, the tunnel has been driven ahead about 9 feet. The ground passed through has been the kind well known by Comstock miners along the line as heavy clay and vein stone ground, requiring the most substantial timbering. Have now driven 22 feet in this clay and vein stone.

IOWA.—Tunnels A and B have made the usual progress, with no material change to report during the past week. The drift south from A tunnel is all in vein matter, with a stringer of nice ore running with the drift, which is improving in size and quality going south.

POTOMAC.—South drift No. 1 on the 250 level has been advanced 30 feet. South drift No. 2 has been advanced 18 feet. Formations same as last week. Have about 500 tons of ore on dump. Will not hoist more until use of a mill can be obtained for crushing same.

BEST AND BELCHER.—600 level—West crosscut No. 2 has been extended 40 feet; total, 154 feet; porphyry formation. 800 level—West crosscut No. 4 has been extended 28 feet; total length, 188 feet. 1500 level—Northeast drift has been extended 48 feet; total, 348 feet.

GOULD AND CURRY.—425 level—East drift has been extended 33 feet; total length, 175 feet; formation in face, clay, porphyry and quartz. The upraise from the south drift on the same level has been extended 25 feet; total, 75 feet; formation, porphyry and stringers of quartz.

BALTIMORE.—Are cleaning out station and drift on the 250 level. The same character of work is being done on the 450 level. Have commenced excavating a station on the 550 level, preparatory to drifting there in promising ground.

CROWN POINT.—About 100 tons of ore are produced daily, principally from the lower levels, and shipped to the Mexican mill. Good progress is being made in the prospecting work inaugurated recently on the 300 and 400 levels.

IMPERIAL.—The work of repairing the shaft near the 600 level continues. By means of this opening excellent ventilation is afforded the miners working in the lower levels of the Yellow Jacket mine.

YELLOW JACKET.—The usual quantities of ore are shipped daily to the Brunswick mill. The yield comes principally from the 1200, 1300 and 1400 levels, and the net result is principally gold.

UTAH.—472 level—The north drift has been extended 43 feet; total length, 79 feet. This drift is in vein matter consisting of porphyry, clay and fine lines or streaks of quartz.

ALPHA AND EXCHEQUER.—North drift in Alpha is in 53 feet in quartz. South drift is in 50 feet, and the west drift 100 feet. Some of the quartz carries ore giving fair assays.

HALE AND NORCROSS.—The 1300 drift has been advanced and timbered 40 feet. Started two new crosscuts south 100 feet from No. 2 crosscut—one east and one west, each of which has been advanced and timbered 5 feet.

SILVER STAR.—The work of crosscutting in the north drift on the 100 level is progressing favorably. The formation encountered is of a kindly character and promises well.

BELCHER.—The Vivian and Santiago mills are kept busy crushing the ore produced from the 1200, 1300 and 1400 levels, the daily yield being 130 tons.

NORTH GOULD AND CURRY.—The work of cleaning out the shaft progresses favorably, and substantial timbers are being put in where necessary.

EAST BEST AND BELCHER.—Fair progress is being made in cleaning out the shaft. Expect shortly to commence important prospecting work.

SCORPION.—Good progress is being made in driving the drift east from the 300 station. Everything working satisfactorily.

SIERRA NEVADA.—520 level—Have advanced the south lateral drift 60 feet; total distance, 134 feet; vein formation.

CHOLLAR.—The main shaft is repaired to a depth of 500 feet.

Bernice District.

SALE OF MINES.—Reese River *Reveille*, Feb. 5: W. W. Williams has purchased the Hoyt and West-ernside mines at Bernice, Churchill county, of C. A. Richards for \$2400, and the property was deeded to the purchaser at Austin last week.

Eureka District.

ORE SHIPMENTS.—*Eureka Sentinel*, Feb. 1: During the past week ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Richmond works—Silver Lick mine, 10 tons; Hoosac, 5 tons; Schenck, 6 tons; General Lee, 4 tons; Williamsburg, 8 tons; Dunderberg, 64 tons; McLeod, 3 tons; Fraser and Mobno, 25 tons.

Pine Grove District.

GOOD INDICATIONS.—*Esmeralda News*, Feb. 5: From a California mining man who has been ex-

pecting the Pine Grove mines the *News* reporter learns that that little heard-of camp is of more importance than is generally supposed. He says the country thereabouts shows indications of great possibilities in the mining line. The country has never been thoroughly prospected. Men have located small ledges, which yielded ore assaying from \$60 to \$100 on the surface, worked them until the ore began to deteriorate and then abandoned them. The Wheeler mine and the Wilson mine are the only two upon which much work is now being done. The owners of these mines are taking out considerable ore and making some money, but, our informant says, lack the enterprise to do development work which he thinks would lead to the discovery of veritable bonanzas. The ore of the district is all free-milling gold.

Santa Fe District.

ORE.—*Esmeralda News*, Feb. 5: Col. A. C. Ellis has a small force employed on his Sunrise mine at Santa Fe District. They are extracting good ore.

Tuscarora District.

TORNADO CON.—*Times-Review*, Feb. 6: During the week have extended west crosscut 10 feet. Have suspended work for the present in main drift. Are working two shifts in crosscut. No material change.

BELLE ISLE.—Line crosscut east, 150-foot level, continues in very hard rock. Total length, 60 feet. Work in west crosscut, same level, has been suspended, and the timbering and tracking are being removed.

NEVADA QUEEN.—The ground is heavy and has been timbered. Crosscut west from the gangway on the 300-foot level, to connect with the shaft, has been extended 15 feet. The rock continues hard.

NORTH BELLE ISLE.—Gangway north from the south end line on the 400-foot level has been extended a total distance of 200 feet. Distance yet to run to reach the shaft is 430 feet. Two hundred feet of the gangway on the 300-foot level has required timbering during the past month. A portion of this is swelling ground. Fair progress has been made with all other work in and about the mine.

NAVAJO.—North drift on new east vein, 150-foot level, was extended five feet and a total distance of 164 feet. The prospects are not being favorable; work at this point has been suspended and work resumed in the face of the crosscut. South drift on west vein, same level, has been advanced six feet. South drift on west vein No. 2 extended 11 feet; total length, 176 feet. Work has been resumed in the winze on the east vein, 350-foot level. There is no material change to report.

COLORADO.

IDAHO SPRINGS NOTES.—*News*, Feb. 5: The Mattie employs some 40 men and is shipping regularly a good grade of ore. William Ireland will have the machinery on the Star mine in running order in a few days. Work at the Plutus continues day and night. The company's mill at the mouth of Trail Run keeps pounding away constantly on ore from this mine, which employs about 40 men. The machinery has been placed in position on the Lexington mine, Squirrel gulch. Some work is being done in getting the shaft in shape, and by Monday sinking will be resumed. A number of miners secured jobs there this week. The Freeland mine has reduced its force. One hundred men were paid off Monday, and shipments will probably cease for four months. This is done to catch up with development. Work in the main shaft and levels progresses day and night. The Argo mine, Ute creek, now gives employment to over 60 men, including leasers and those doing company work. A new level has been started from the bottom of the shaft, and when in sufficient distance sinking will be resumed. Fifty tons of first-class ore was shipped to the sampling works during the month of January. The Bald Eagle, one of the Argo group, is shipping ore which nets \$118 per ton. A night shift will be added to this mine and the output increased. The Argo is destined to make an excellent property.

IDAHO.

FLINT.—*Idaho Avalanche*, Feb. 2: Mr. Dow Vincent, of Jordan creek, below Flint district a few miles, made us a call on Monday. From him we learned that the prospects of that camp never looked brighter. Rich ore is being extracted from several of the mines of the Flint Co., and much development work is being done. By spring Mr. Vincent thinks that the mines will be opened to such an extent that hundreds of tons of ore will be extracted daily. Flint will boom in the spring, and as soon as the plant is ready will produce regularly a good dividend.

ERA.—*Challis Messenger*, Feb. 5: Geo. Clark returned Saturday from Era, where he had been on a short trip. We learn that the mill is running right along, but that outside of that and the work done in the Horn Silver to supply the mill with ore, nothing of any consequence is being done in that section of the country.

MONTANA.

STILL SHUT DOWN.—*Butte Inter-Mountain*, Feb. 1: A gentleman who came up from Anaconda this morning says that the matting furnaces are still all shut down, owing to the fact that not sufficient coal has been received as yet to insure a continued supply. The concentrator is running as usual, however, and the regular daily shipments of ore from the mine are being received. The furnaces will start up as soon as the snow blockade is broken, so that there will be no further danger of a shortage of coal.

OREGON.

GOLD HILL.—*Cor. News*, Jan. 27: J. J. Parker and William Crossley, two old Black Hill miners, who have recently arrived at Gold Hill from Cœur d'Alene, speak very encouragingly of that locality, and say that Southern Oregon mines are the worst underrated mines in the United States, and that it is only a matter of a short time until Gold Hill is a great mining camp. All that is wanted is practical miners and capital to open the mines, and in a short time the prejudice that now exists against Southern Oregon mines as pocket ledges will be removed. There are 50 ledges within a radius of five miles of Gold Hill that will pay to work, and not a prospect hole 20 feet deep on any of them.

List of U. S. Patents for Pacific Coast Inventors.

From the official report of U. S. Patents in Drawings & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING FEBRUARY 1, 1887.

357,139.—CHEMIST'S BALANCE—Aitwood & Taylor, Oakland, Cal.
356,977.—WATER-WHEEL BUCKET—L. Biggio, Sutter Creek, Cal.
356,983.—MUSIC LEAF-TURNER—P. L. Carden, Dixon, Cal.
357,063.—PENCIL—W. C. Carlton, Baker Co., Ogn.
357,117.—TIME INDICATOR—J. H. Culver, S. F.
356,821.—GRATE—De Guerre & De Lano, S. F.
356,829.—REEL-SUPPORTING ARM—J. B. Gemmill, Red Bluff, Cal.
356,941.—PHOTOGRAPHIC CAMERA—Oliver Hydc, Vallejo, Cal.
357,151.—HARROW—D. Lubin, Sacto.
357,152.—CLOD CRUSHER AND PULVERIZER—D. Lubin, Sacto.
356,948.—DUMB-WAITER STOPS—J. J. Mahoney, S. F.
356,960.—TROUSERS STRETCHER—C. E. Ray, S. F.
356,961.—BREECH-LOADING FIREARM—J. W. Redfield, Glendale, Ogn.
356,955.—KITCHEN CABINET—B. C. Tabor, Salen, Ogn.
356,857.—WINDOW—Henry Tintrop, S. F.
NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ROLLER MILL.—George Cottrell, S. F. No. 356,623. Dated Jan. 25, 1887. The object of this invention is to provide simple and effective means for adjusting the rolls of the mill, which is done by peculiar construction of various parts.

SEWING MACHINE.—Chas. Kohler, Oakland, assignor to the Commercial Overseaming Sewing Machine and Manufacturing Co. No. 356,590. Dated Jan. 25, 1887. This invention is especially adapted to that class of machines which are designed for overseaming or sewing hags and similar goods, in which it is desirable to unite the edges by this particular form of stitch. The inventor patents a combination of devices.

CULTIVATOR.—Peter Frichette, Sheridan, Placer Co. No. 356,631. Dated Jan. 25, 1887. This is a cultivator or harrow of peculiar construction. The rotary movement of the standards of the front wheels enables the machine to make its turn, and provides for the use of four wheels instead of the usual three. When used as a simple harrow, the wheels and adjusting devices are omitted. Light plow teeth may be used when the work requires it.

HARVESTER.—Xavier H. Martineau, Fish Lake valley, Nev. No. 356,655. Dated Jan. 25, 1887. This is a mechanism for adjusting the draper-platform, and an improvement in the driving mechanism for the draper and sickle, adapted to adjust itself to the movement of the draper-platform. The object is to provide a simple means for adjusting the draper-platform for a high or low cut, as may be desired, and to provide suitable driving mechanism to adapt itself to the adjustment of the platform.

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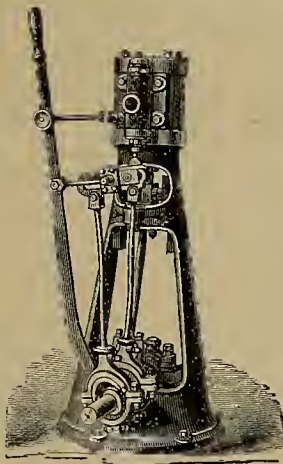
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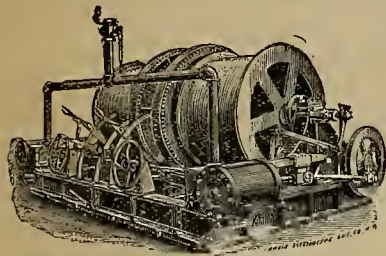
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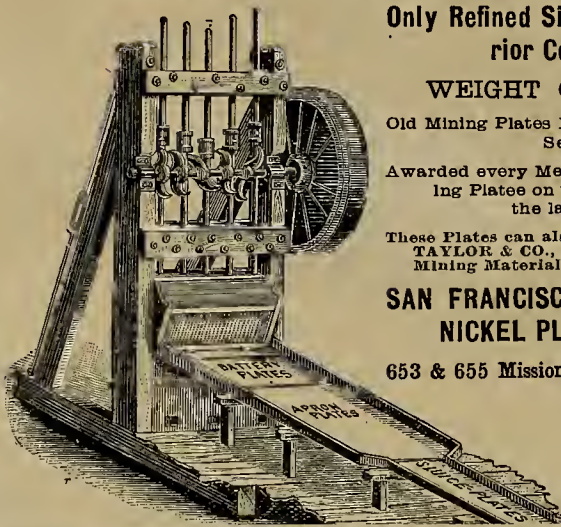
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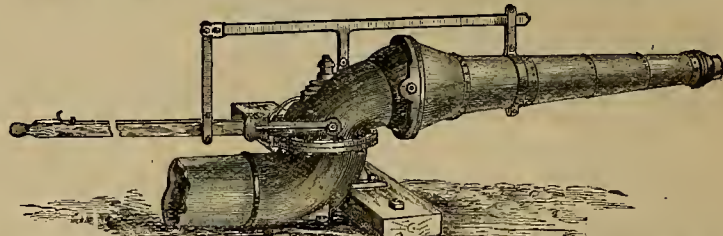
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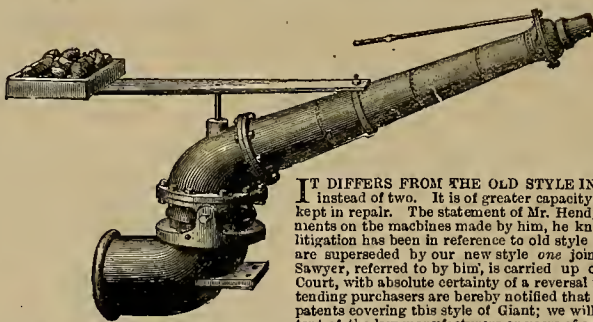


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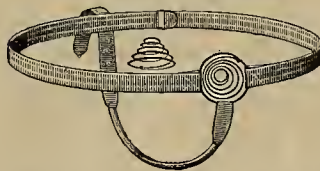
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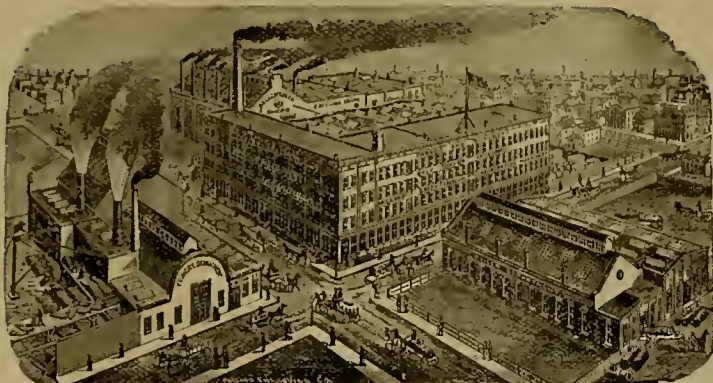
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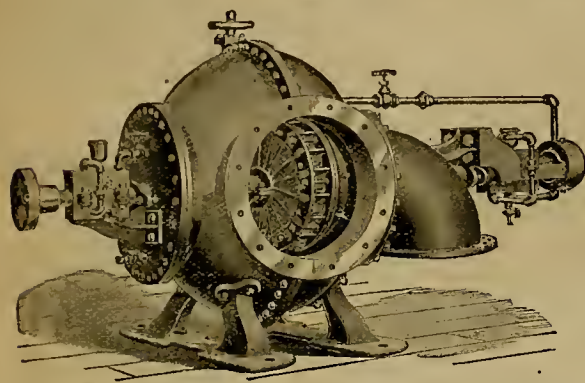
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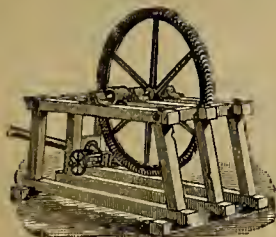
Springfield, Ohio, or 110 Liberty St., New York.

FRASER & CHALMERS, General Agents,
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KNIGHT'S WATER WHEEL



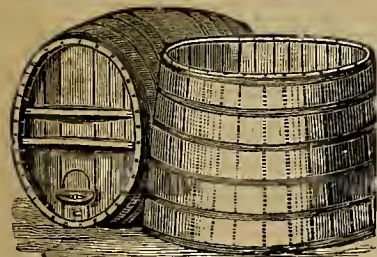
For Mills, Pumping and Hoisting.

OVER 300 IN USE!

All Estimates Guaranteed.
SEND FOR CIRCULAR.

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WATER TANKS! WINE TANKS!
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FULDA BROS., Proprietors,
30 to 40 Spear St., - San Francisco.
ALL KINDS OF CASKS, TANKS, Etc.
SHIP, MINING, and WATER TANKS a Specialty.

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ONE 30-GANG PIANO PUNCH.

Immediate Delivery if desired.

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THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

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218 California Street, San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS and LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

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CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

THOMAS PRICE'S ASSAY OFFICE,

CHEMICAL LABORATORY,

BULLION ROOMS and ORE FLOORS,

524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

Academy of Sciences.

Dr. Harkness presided at the meeting of the Academy of Sciences on Monday evening last. Prof. Frank Soule and Dr. F. V. Hopkins were proposed for membership.

Dr. Bshar stated that since the last meeting Dr. Hammond had donated to the academy some fossil shells and the tooth of a horse found at a depth of 35 feet below the surface of Alameda creek. The doctor said he was not enough of a paleontologist to determine whether these specimens, either the shells or the tooth, belonged to extinct species, or to species now living. An enormous ivory tusk, 11 feet long and well preserved, of a mastodon, which was obtained from the natives of Alaska by Captain James McKenna and presented to the academy two years ago, has been placed in the museum, having been brought from the Merchants' Exchange, where it has been for two years past for the inspection of the ship captains and others.

Dr. C. M. Richter read a paper on "The Ocean Currents on the Western Coast of North America."

Announcements were made of the following appointments by the council: Publication Committee—H. W. Harkness, E. L. Greene, C. G. Yale, C. Troyer, George Hewston, Curators—Botany, M. K. Curran, E. L. Greene. Ethnology, S. Wooster, Mammals and birds, E. F. Lorquin, W. E. Bryant. Reptiles and radiates, Rosa Smith, H. E. Lorquin. Geology and paleontology, E. S. Clark, George Hewston. Mineralogy, Melville Attwood, C. D. Gibbes.

President Harkness exhibited some specimens of *Corticopis hugelii*, a remarkable fungus from Australia and New Zealand. He showed a species of caterpillar which never appeared above the surface of the ground, and from the head of which, after it died, springs a fungus growth having the appearance of a vine.

Dr. Bshar read a eulogy on the late Isaac Lea, the first honorary member elected in the academy and a member of a number of scientific and other societies both in America and Europe.

The secretary, Mr. Yale, stated that hereafter papers read before the academy would not be considered as intended for publication unless they were handed to the secretary immediately after they were read.

Mining Share Market.

Mining stocks have been rather active the past week. The Con. Virginia and California mine has declared another dividend of 50 cents, aggregating \$108,000. The first shipment of ore from the recent development on the 600-foot in the Savage mine has been made to the Mexican mill. The Overman has commenced to make daily shipments of 60 tons to the Vivian mill. The above mills have heretofore been crushing Crown Point and Belcher ore. The output from the latter mines will therefore be materially curtailed. The members of the Jones crowd, who control Crown Point and Belcher, are also heavy holders of Savage and Overman stock.

The several producing mines look well and give promise not only of continuing to yield for a long time at the present rate, but of a steady increase in productivity. Among the mines that were idle for quite a period until recently, and are now being prospecting, are several that, judging from the developments made and making in them, will soon be added to the list that are milling ore.

The following companies reported having had cash on hand Feb. 1, 1887: Sierra Nevada, \$23,417; Crown Point, \$24,210.74; Gould & Curry, \$4,872.42; Occidental, \$1,922.24; Chollar, \$43,871.07; Potosi, \$13,456.67; Exchequer, \$17,629.41; Mexican, \$2,082.89; Ophir, \$37,136.94; Crocker, \$5,961.46; Peerless, \$12,127.47; Peer, \$7,844.91; Con. California and Virginia—cash in bank \$346,336.42, and bullion unsold \$187,320.05; Utah, \$37,600; Orleans, \$1,703.40; Syndicate, \$9,591.90; Best and Belcher, \$15,493.92; Alpha Consolidated, \$6,460.02; Bulwer Consolidated, \$21,000; Bodie Consolidated, \$11,844.38; Mono, \$20,800.71; Tioga, \$31,180; Summit, \$495.26; Booker Consolidated, \$852.89; Lady Washington, \$18,640; Alta, \$20,341.51; Benton Consolidated, \$5,231.06; Belcher, \$3,688.52; Navajo, \$2,923.34; North Belle Isle, \$2,501.15; Belle Isle, \$1,880; Standard Consolidated, \$22,834.09; Independence, \$8,825.77; Andes, \$1,333.82.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

WILLIAM PENN M. Co. Feb. 9. Location, Plumas Co. Capital stock, \$300,000. Directors—John G. Phelps, Frances Gallego, George Sebaretz, John B. Fulton and Albert White.

CALIFORNIA GAS FIXTURE CO. Feb. 5. Object, manufacturing and selling gas fixtures, lamps and oils. Capital stock, \$100,000, in 1000 shares. Directors—Joseph Simonson, Frederick W. Farrar, Ralph P. Merillon, George F. Duffy and Eugene J. Duffy.

CALIFORNIA PAINT CO. Feb. 9. Object, mining, manufacturing, etc., mineral, metallic and other paints. Capital stock, \$200,000, in 2000 shares. Directors—J. S. Keeling, C. H. Miles, J. H. Woodward, A. J. McGovern, Wm. Alberger.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Silver Bow, Feb. 1, \$19,860; Bluebird, 1, \$22,376; Derbec, 3, \$70,000; North Bloomfield, 3, \$76,000; Eureka Con., 4, \$11,612; Richmond Con., 4, \$18,723; Locomotive, 5, \$36,620; Marget Ann, 1, \$4,000; Alice, 5, \$24,192; Marget Ann, 5, \$24,000; Bluebird, 5, \$22,704; Alice, 6, \$32,000; Lexington, 6, \$25,336; Silver Reef (for January), \$30,192; Germania, 4, \$37,655; Hanauer, 5, \$29,000; Germania, 5, \$39,471; Hanauer, 8, \$58,500; Bannock, 8, \$42,000; Germania, 8, \$37,550.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.		LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Con M Co.	.....	Nevada, 21.	50, Jan 12, Feb 17.	Mar 10.	L Osborn.	379 Montgomery St
Andes S M Co.	.....	Nevada, 31.	25, Jan 24, Mar 5.	Mar 23.	B Burris.	309 Montgomery St
Alta S M Co.	.....	Nevada, 33.	50, Feb 5, Mar 18.	Apr 5.	W H Watson.	302 Montgomery St
Bodie Con M Co.	.....	California, 5.	50, Jan 24, Feb 23.	Mar 23.	G W Sessions.	309 Montgomery St
Bullion M Co.	.....	Nevada, 32.	40, Jan 22, Mar 1.	Mar 17.	R R Grayson.	327 Pine St
Benton Con M Co.	.....	Nevada, 17.	25, Jan 28, Mar 21.	Mar 24.	W H Watson.	302 Montgomery St
Columbus Con M Co.	.....	Nevada, 5.	50, Dec 22, Jan 27.	Feb 18.	J M Buntington.	309 California St
Dictator Con M Co.	.....	California, 10.	10, Dec 15, Jan 22.	Feb 12.	J P Boller.	Hawthorne Nev
Excelsior W & M Co.	.....	California, 10.	15, Jan 3, Feb 3.	Feb 21.	W J Stewart.	215 Sansome St
Four Hills Mine.	.....	California, 1.	25, Jan 22, Feb 23.	Mar 21.	F S Moody.	328 Montgomery St
Golden Fleece Gravel M Co.	.....	California, 8.	10, Jan 27, Mar 8.	Mar 23.	W J Gleason.	310 Phelan Block
Golconda M Co.	.....	California, 2.	03, Dec 22, Jan 27.	Feb 18.	J M Buntington.	309 California St
Gold Point Con & S M Co.	.....	California, 13.	01, Jan 8, Feb 10.	Feb 20.	A B Brady.	328 Montgomery St
Hubert Concentrator Co.	.....	California, 10.	10, Jan 17, Feb 20.	Mar 14.	M Livingston.	330 Montgomery St
Hazard Gravel M Co.	.....	California, 1.	03, Jan 26, Mar 1.	Mar 25.	J T McGeoghegan.	328 Pine St
Indian Springs Drift M Co.	.....	California, 7.	30, Dec 30, Jan 31.	Feb 15.	L H Sharp.	215 Sansome St
Kincaid Flat M Co.	.....	California, 2.	2,00, Jan 5, Feb 14.	Mar 7.	W H Keith.	432 California St
Lone Jack M Co.	.....	California, 16.	05, Jan 22, Mar 7.	Mar 23.	J M Buntington.	302 Montgomery St
Lady Washington M Co.	.....	Nevada, 6.	25, Jan 28, Mar 7.	Mar 23.	W H Watson.	302 Montgomery St
Manhattan S M Co.	.....	Nevada, 2.	1,00, Feb 2, Mar 7.	Mar 22.	J Crockett.	327 Pine St
Mexican G & S M Co.	.....	Nevada, 33.	25, Jan 4, Feb 9.	Mar 2.	O B Elliot.	309 Montgomery St
Mountain Tunnel G M Co.	.....	California, 3.	15, Jan 25, Feb 28.	Mar 1.	A B Paul Jr.	Safe Deposit Building
Mayflower G M Co.	.....	California, 34.	25, Jan 19, Feb 23.	Mar 13.	J Moritz.	328 Montgomery St
North Comstock M Co.	.....	Nevada, 2.	10, Jan 13, Feb 14.	Mar 1.	P B Dietz.	327 Pine St
North Belle Isle M Co.	.....	Nevada, 11.	50, Jan 12, Feb 15.	Mar 9.	J W Pew.	310 Pine St
Nevada Queen M Co.	.....	Nevada, 1.	30, Jan 11, Feb 8.	Mar 3.	H Dens.	309 Montgomery St
Nevado Id Co.	.....	Nevada, 16.	25, Jan 7, Feb 10.	Mar 3.	J W Pew.	310 Pine St
N Banner Con F Co.	.....	California, 16.	09, Jan 10, Feb 5.	Feb 26.	J J Mich.	400 Grass Valley
Overman S M Co.	.....	Nevada, 57.	30, Jan 21, Feb 25.	Mar 18.	G D Edwards.	414 California St
Occidental M Co.	.....	Nevada, 8.	40, Feb 3, Mar 10.	Mar 31.	A K Durbrow.	339 Montgomery St
Pennsylvania Con M Co.	.....	California, 5.	01, Jan 4, Feb 7.	Mar 1.	M Byrne Jr.	Grass Valley
Prunehatch M Co.	.....	California, 2.	20, Jan 4, Feb 14.	Mar 3.	H Pichor.	200 N. Bell.
Sierra Nevada S Co.	.....	Nevada, 37.	25, Jan 4, Feb 4.	Mar 1.	L L Parker.	306 Montgomery St
Spring Valley M Co.	.....	California, 2.	54, Jan 22, Mar 5.	Apr 4.	H Pichor.	320 Sansome St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Alabama, Humboldt & Bailey Cos.	W H Watson.	302 Montgomery St.	Annual, Feb 14
East Mt Diablo M Co.	Nevada, G W Fisher.	318 Pine St.	Annual, Feb 19
Lucky Hill Con M Co.	California, F D Black.	27 Ellis St.	Annual, Feb 19
Murchie M Co.	California, A W Blundell.	124 California St.	Annual, Feb 15
Utah S M Co.	Nevada, A H Fish.	309 Montgomery St.	Annual, Feb 10
West Blue Gravel M Co.	California, G A Ben.	313 Montgomery St.	Annual, Feb 21

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada, A W Havens.	309 Montgomery St.	50.	Feb 10
Martin White M Co.	Nevada, J J Scoville.	309 Montgomery St.	25.	Dec 20
Paradise Valley M Co.	Nevada, W Letis Oliver.	323 Montgomery St.	10.	Nov 30
Silver King M Co.	Arizona, J Nash.	328 Montgomery St.	25.	Feb 15

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 20.	WEEK ENDING Jan. 27.	WEEK ENDING Feb. 3.	WEEK ENDING Feb. 10.
Alpha.....	3.00	3.75	2.25	3.60
Alta.....	2.75	3.00	2.25	2.91
Andes.....	1.50	1.65	1.25	1.70
Argenta.....	4.00	4.75	3.50	4.50
Belcher.....	4.00	4.75	3.50	4.50
Bodie.....	6.00	1.00	.75	.90
Best & Belcher.....	9.00	10.11	12.80	11.94
Bullion.....	3.00	3.30	2.50	3.30
Bulwer.....	1.05	1.30	1.00	1.10
Belle Isle.....	1.05	.35	.25	.30
Bodie Con.....	2.75	3.05	1.85	3.00
Benton.....	.80	.95	.75	.85
Belle Tunnel.....	1.00	1.10	.75	.85
Bulwer.....	1.00	1.10	.75	.85
Con. Va & Cal.....	2.00	2.21	2.21	2.60
Challenge.....	2.00	2.30	2.00	2.40
Champion.....	.60	.75	.75	.85
Chollar.....	.60	.75	.75	.85
Con. Idaho.....	1.50	1.80	1.50	1.80
Con. Imperial.....	1.85	2.00	1.00	1.60
Caledonia.....	.65	.75	.55	.70
Con. Pacific.....	.35	.30	.35	.30
Crown Point.....	6.00	6.00	6.00	6.00
Crocker.....	1.30	1.35	1.00	1.10
Central.....	.50	.65	.50	.70
Dudley.....	.25	.25	.25	.25
East B. & B.....	.25	.25	.25	.25
Eureka Con.....	4.75	5.00	4.75	5.00
Exchequer.....	2.00	2.30	1.60	2.00
Grand Prize.....	.50	.50	.50	.50
Gould & Curry.....	5.00	6.25	6.25	6.25
Hale & Norcross.....	7.25	11.75	9.00	8.50
Holmes.....	2.75	2.60	2.60	2.60
Independence.....	1.40	1.15	1.00	1.25
Iowa.....	1.40	1.15	1.00	1.25
Julia.....	.90	1.05	.60	.85
Justice.....	2.00	2.15	1.50	1.90
Kentuck.....	.50	.70	.40	.55
Lady Wash.....	.50	.70	.40	.55
Martin White.....	3.00	3.30	2.70	3.10
Mono.....	6.00	7.00	6.00	7.00
Mt. Diablo.....	3.00	3.00	3.00	3.00
Northern Belle.....	6.00	6.00	6.00	6.00
Navajo.....	3.15	3.50	3.30	3.50
North Belle Isle.....	.45	.50	.45	.50
Niagara.....	.75	1.05	.50	.90
Queen.....	.75	.55	.50	.55
North G. & C.....	4.00	4.00	4.00	4.00
Occidental.....	1.03	1.21	1.21	1.21
Ophir.....	1.75	2.00	1.30	1.75
Overman.....	9.25	9.25	9.00	9.75
Peerless.....	.60	.70	.90	.65
Peer.....	.55	.60	.50	.45
P. Sheridan.....	.30	.40	.15	.35
Silver Star.....	.75	.80	.75	.80
Savage.....	.75	.80	.75	.80
Seg. Belcher.....	5.75	6.75	6.00	6.75
Sierra Nevada.....	.45	.60	.35	.50
Silver Hill.....	.45	.60	.35	.50
Silver King.....	.45	.60	.35	.50
Scorpion.....	1.30	1.45	1.25	1.40
Syndicate.....	.25	.20	.20	.20
Union Con.....	4.90	5.00	5.25	5.00
Utah.....	5.50	6.00	6.50	6.00
Yellow Jacket.....	6.50	7.00	7.75	6.50

Sales at San Francisco Stock Exchange.

THURSDAY Feb. 10, 1887.	100 Iowa.....	1.00
500 Alta.....	550 Julia.....	.60c
75 Andes.....	15 Lady Wash.....	.20c
250 Alpha.....	795 Mexican.....	.60c
390 B. & Belcher.....	50 Mono.....	.25
370 Bullion.....	2.20c 25c 450 Mt. Cory.....	.71
50 Bodie Con.....	1.00 Mt. Diablo.....	4.00
100 Belcher.....	2.20 N. Bell.....	4.00
100 Baltimore.....	.75c 350 Nev. Queen.....	.11c 55
200 Bulwer.....	1.20 300 Navajo.....	.95c
200 Belle Isle.....	.55c 125 North G. & C.....	.45c
200 Brophy.....	.55c 370 Ophir.....	.11c 211
1000 Chollar.....	400 Overman.....	1.05c 60
90 Con Va & Cal.....	15c 250 Peerless.....	.60c
225 Crown Point.....	3.00c 350 Potosi.....	.71c 71
100 Crocker.....	.95c 100 Peer.....	.45c
150 Con. Imperial.....	1.55 825 Savage.....	.50c 82
130 Con. Scorpion.....	7.50 900 Sierra Nevada.....	.41c 60
700 Exchequer.....	1.45c 150 700 Union Con.....	.47c
100 East B. & B.....	1.00 100 Utah.....	.60c
450 Gould & Curry.....	.45c 200 Yellow Jacket.....	.61c 55
320 Hale & Nor.....	.51c 200	

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OUR NEW PHOTOGRAPHOTYPES,

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STAND NEXT TO STEEL PLATE ENGRAVING IN FINENESS AND PERFECTION. THEY ARE PRODUCED QUICKER AND CHEAPER THAN ANY OTHER GOOD ENGRAVING, THROUGH THE GREATEST INVENTION YET MADE IN PHOTO-ENGRAVING.

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SPECIAL PHOTO WORK,

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Designs, drawings or photographs made to order. Engravings of buildings, Portraits, Maps and Scenery and Photo Samples for Salesmen are leading specialties.

Send, as early as possible, with full description for any work desired, stating size and for what use plates are wanted. Photographs and prints similar to those desired, will aid us in making definite estimates. Agents wanted.

Call and see specimens, or write for samples, prices and any further information wanted to

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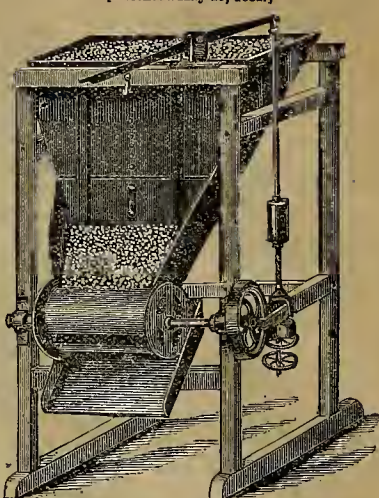


UNCLE Sam has found it at last! A sure remedy for Torpid Liver, Sick Headache, Habitual Constipation, Chills and Fever, and all affections of the Kidneys and Liver. This is a New Compound, and one trial will convince you that it is the Cheapest and Best Remedy in the Market for Diseases of Kidneys, Liver and Stomach. If you want a pure vegetable compound, that is positively guaranteed to contain no narcotics, go to your Druggist, and get a Bottle of the Arkansas Liver and Kidney Remedy. Price, \$1.00 per Bottle.

For Sale by all Druggists.

THE ROLLER ORE FEEDER

[Patented May 28, 1882.]



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

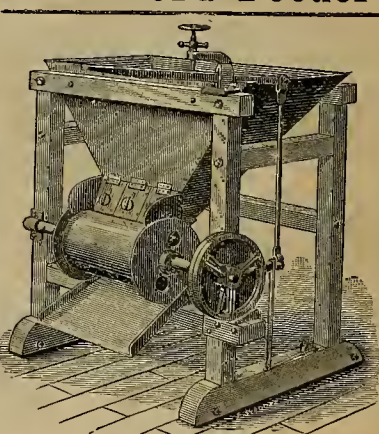
In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

Golden State and Miners' Iron Works.

Sole Manufacturers.

227 First Street, San Francisco, Cal.

THE ORIGINAL Roller Ore Feeder



This form of Ore Feeder is well adapted for its peculiar work.

In reference to a similar form of "Roller" Feeder, which is being manufactured and offered for sale in this city, and of which a cut appears in this journal, we have to say that the Superintendent of the Bunker Hill Gold Mining Company states that the "Challenge" is far superior to the "Roller," he having had both of them operating side by side. We shall be pleased to show the latter, upon application, to any one interested. We are also manufacturers of the "Challenge" and "Stanford Improved."

Prices furnished by the

JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont St., San Francisco.

ORE FEEDERS.

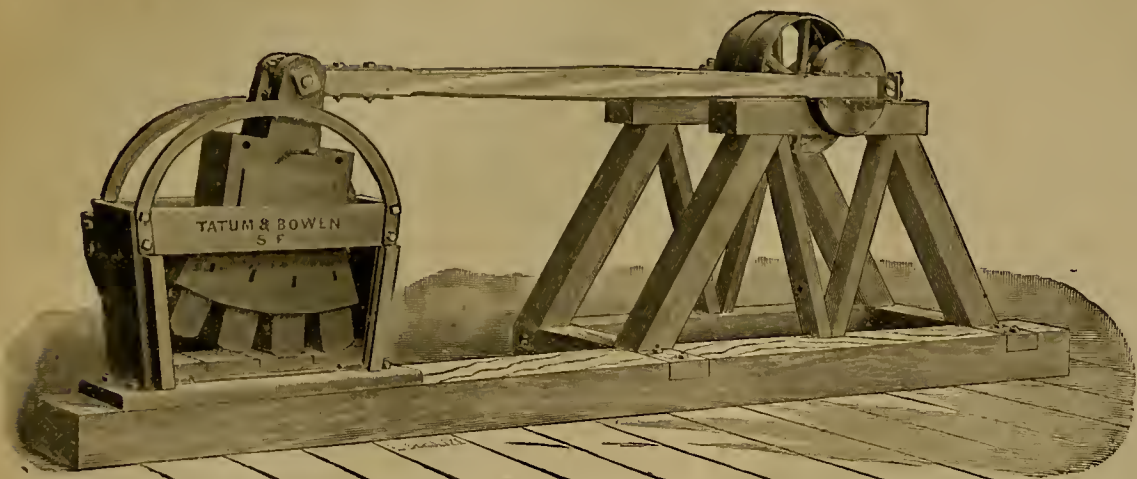
We direct attention to an advertisement, which appears in our journal of the "Original Roller" Ore Feeder, manufactured by the "Joshua Hendy Machine Works," of Nos. 39 to 51 Fremont St., this city. As the manufacturers of a similar form of Feeder, known as the "Templeton Roller," claim that it is superior to any other style, and cite those in operation at the "Bunker Hill" mill in Amador county, we expressly contradict the statement, and in substantiation submit a copy of a letter shown to us by a representative of the "Joshua Hendy Machine Works," which speaks for itself.

BUNKER HILL GOLD MINING CO.

AMADOR COUNTY, CAL., July 12, 1886.

To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: We have used the "Challenge" and "Roller" or "Templeton" Ore Feeders in our mill for the past three years, and I am free to say that I consider the "Challenge" far superior to the "Roller" Feeder, in that most important of all things in a quartz mill, namely, the regular feeding of ore to the batteries. If the "Roller" Feeder is regulated to feed finely pulverized ore, the coarser ore will choke the outlet of the Feeder, and no ore can reach the batteries. If, on the other hand, it is regulated to feed coarse ore, then the fine ore when it comes will sluice right through and fill the batteries.

JAMES' PATENT RECIPROCATING STAMP MILL



(PATENTED AUG. 16, 1881.)

Weight of Boss and Shoes (1200 pounds) acts on each Shoe separately. It is practically the same as the regular Stamp Mill.

Capacity, 6 Tons in 24 Hours. 4 H. P.

Parties wishing to test the Mill with any ore they may bring, will find one in operation at our works in this city.

PRICES:

Reciprocating Stamp Mill,	\$350 00
Rock Breaker, - - -	100 00
Automatic Ore Feeder, -	50 00
Single Track Ore Car, - -	40 00

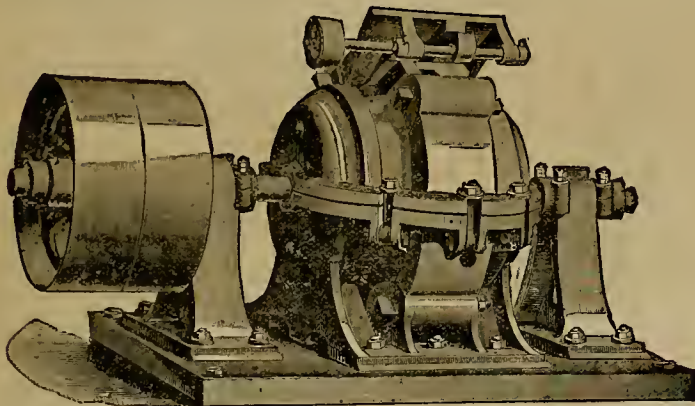
Send for Circular.

TATUM & BOWEN,

34 and 36 Fremont Street, SAN FRANCISCO, CAL.

91 and 93 Front Street, PORTLAND, OREGON.

THE FRISBEE-LUCOP MILL,



A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied. At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet. All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco. Certificates as to performance of the Mills, and any information required, furnished on application.

THE FRISBEE-LUCOP MILL CO.,

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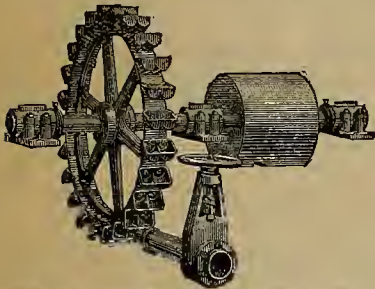
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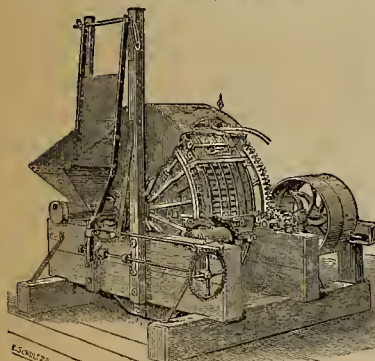
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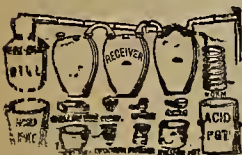
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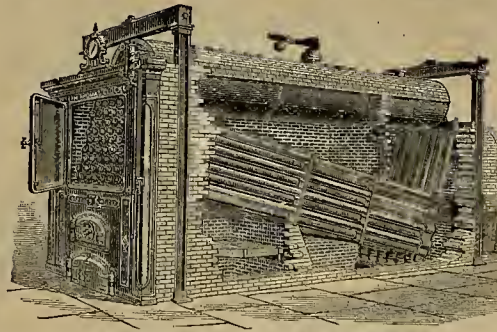
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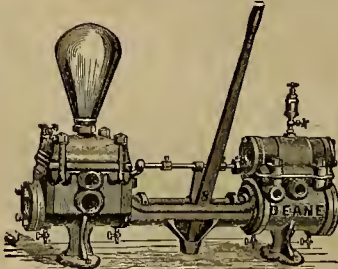
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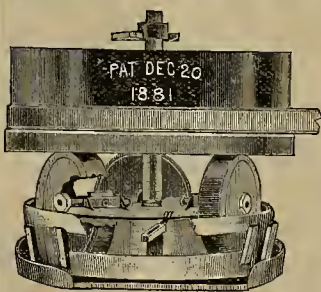
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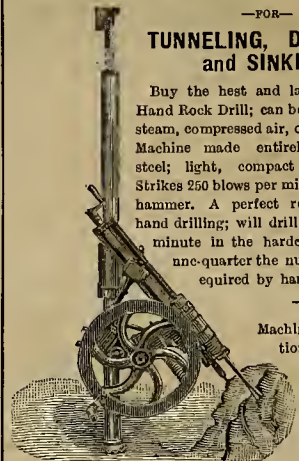
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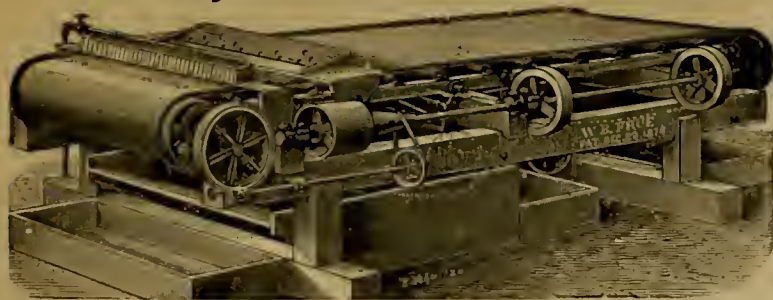
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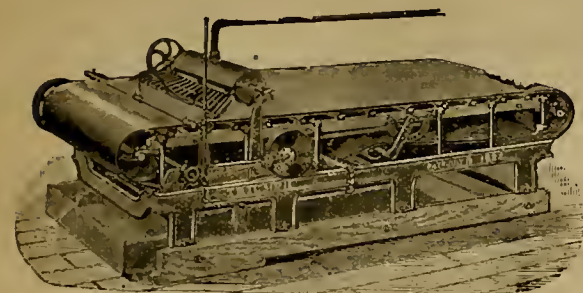
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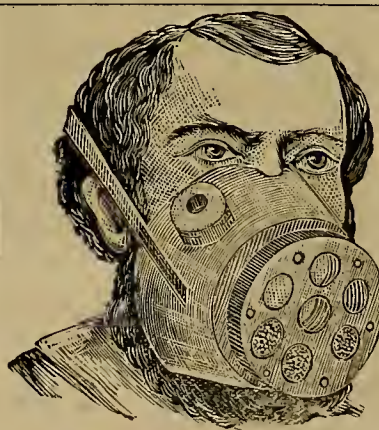
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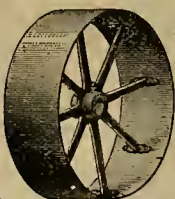
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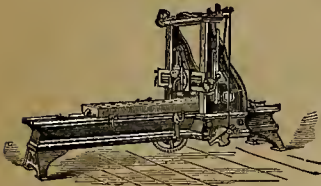
NEW YORK OFFICE, 18 BROADWAY Room 709.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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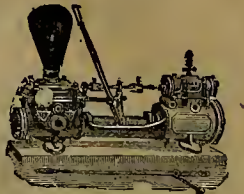


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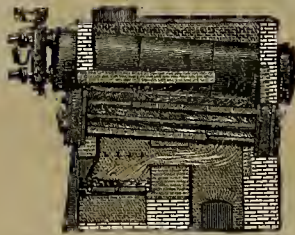
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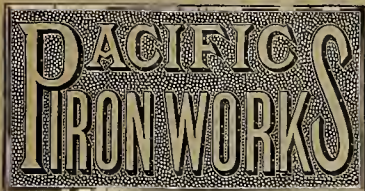
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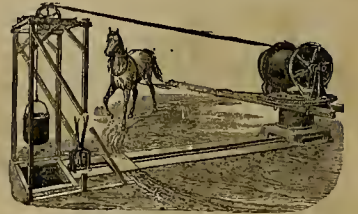
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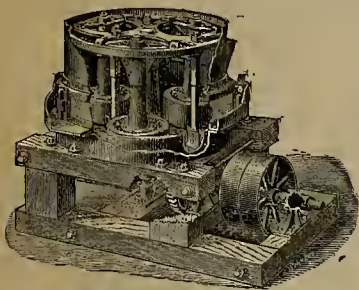
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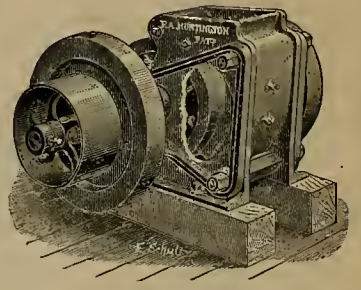
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, FEBRUARY 19, 1887.

VOLUME LIV.
Number 8.

An Improved Automatic Cut-Off.

With this number we illustrate an engine fitted with a new automatic cut-off, the invention of R. A. McLellan, assistant engineer of the Geary-street Cable R. R. This cut-off was invented with the view of simplifying as much as possible the valve gear of an engine, with the additional merit of attaining as near theoretical requirements as the demands of the day call for. Aside from the cut-off, the engine has been carefully designed, and embodies, as nearly as possible, all the merits of the most improved modern engine. Although not indispensable, the "poppet" valve is used in this design, it being in the estimation of the inventor the best form of steam distributing valve ex-

with the use of centrifugal force as the governing principle. As point *H* of the cut off arm is moving in unison with the crosshead, it will be readily seen that the nearer the hook is to the point of suspension of the link *G* the shorter the cut-off, and vice versa. Both steam and exhaust valves are lifted by radial cams acting upon lifting levers, the ends of which are forked, one side fitting into the square portion of the valve-stem, and not shown in the engraving. Lap and lead are invariable under all degrees of expansion. By placing the valves on the top and bottom of the cylinder, instead of on the side, as is usual, the practice of the best builders has been followed, the clearance is reduced to a minimum, and means are fully provided for the instant removal of any water

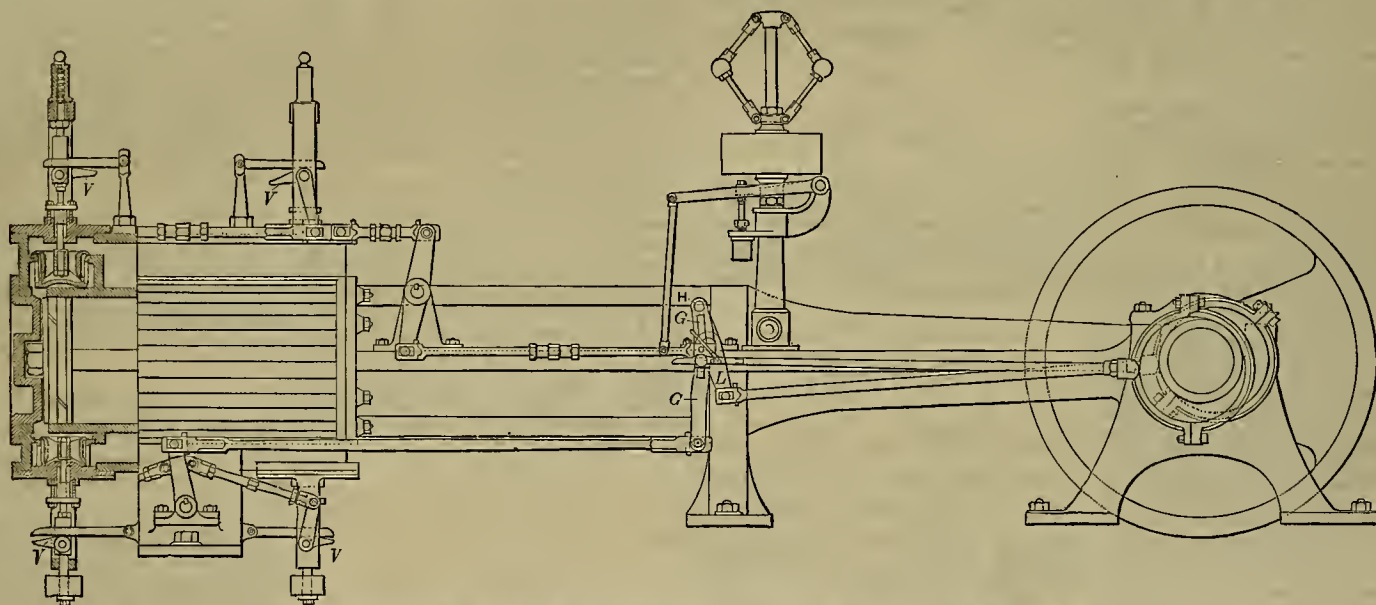
Milling on the Comstock.

Although there are many people who suppose little is going on about the Comstock in the way of working ore, and who think the "camp" is a kind of dead one, this is by no means the case. Immense quantities of ore are being hoisted and worked. The mines are being developed and prospected in all directions. A great many old ones have lately been reopened, and those which have been worked continuously for years are being energetically developed. While only one of these mines paid any dividend this month—the Consolidated California and Virginia—those that are turning out ore are, of course, yielding more or less. If the district were a new one there would be a

The Mining Laws.

When the mining laws passed by Congress were approved May 10, 1872, it was thought that the new code regulating mineral lands covered every desired point. For a long time the regulations worked well, and very few amendments or changes were found necessary. The main feature of the laws was that which required an annual expenditure (in money for labor) on each claim, and it was thought this would break up the custom of men holding large quantities of ground. The compulsory expenditure was intended to make men work and develop their claims or give them up.

It is found now that while the object of the law is accomplished in some instances, it fails



McLELLAN'S IMPROVED AUTOMATIC CUT-OFF FOR STEAM ENGINES.

tant—its simplicity, low first-cost, and the ease with which it is kept steam-tight, all recommending it. As will be seen, the engine has few parts, all of which are easily accessible, and not liable to get out of repair. This also permits of comparatively high rotative speed, for which this cut-off is particularly adapted. Referring to the cut-off, two eccentrics are used, one of which is set coincident with the cross-head, the other set in advance of the crank 135°. This adjustment of the eccentrics, which form one of the principal features of the cut-off, gives an exceedingly quick steam admission, the action of which is not unlike that produced by the wrist-plate used on the Corliss engine. It will be observed that although the eccentric is set to close the steam valve at one-half stroke, yet by the prolongation of the vibrating link, *G*, beyond its point of connection with the eccentric rod *e*, the exhaust valves are also actuated by it, closing at about seven-eighths of the stroke. It will follow, therefore, that steam admission is not limited to one-half stroke, but depends upon the length of the slotted portion of the link, this being at the option of the builder. The point of cut-off is determined by the link block in the link *S*, this block being adjusted by the governor, which by the use of radial cams *v, v, v, v*, for lifting the valves, is very slightly disturbed, and will keep the engine as close to a uniform speed as it is possible

finding its way into the cylinder by the foaming of dirty boilers or rapid condensation. Taken altogether, the engine appears to us to present many valuable features, suggesting a close study of the engines built by the celebrated firm of Sulzer Bros., Winterthur. This patent is for sale, further particulars of which can be had by applying to the inventor.

THE low grade of ore recently produced from the Crown Point is the cause of the management of that mine relinquishing the Vivian mill to the Overman, in which mill Senator Jones is reported to hold a controlling interest. The curtailing of the milling facilities heretofore employed in crushing Crown Point ore has resulted in a corresponding decrease in the ore output from that mine and a material reduction in the force of miners.

U. S. SENATOR WILLIAMS has introduced a bill, intended to authorize the redemption of \$20 gold certificates at San Francisco. Merchants on the Pacific Coast cannot get enough \$20 gold pieces now, and it is desired that the law shall be amended to give greater convenience to the business men of the coast.

THE Wheatland Graphic says there are rumors of fine quartz ledges in the foothills near that place, and hopes for a mining boom.

great deal of talk about the ore product and the wonderful mines; but the yield of these mines in the past has dimmed their present decreased production.

There is a total of 499 stamps in quartz mills contiguous to the Comstock, including the Thompson mill, fitted with a Huntington crusher, which is rated at 30-stamp power. The following list of available mills, and the number of stamps of each, we take from the Virginia Chronicle:

Water-power—Mexican, 40 stamps; Morgan, 40; Brunswick, 56; Santiago, 28; Vivian, 16; Eureka, 60; Rock Point, 20; Douglass (Dayton), 5; Briggs, 12; Pollard, 8; Bowie, 5; Empire State, 5; Fisher's, 2; Hully's (lower mill), 5; Courser, 5; Bossell, 5; Pfeiffer's, 2.

Steam-power—Thompson (Huntington crusher), 30-stamp power; Rhode Island, 30; Petaluma, 24; California, 80; Douglass, 12; Winfield, 5; Baltimore, 10.

Of the above there are now a total of 320 stamps dropping night and day—all, with the exception of the Pollard and Douglass mill, on ore from mines along the Comstock lode. The pulverizing capacity of a quartz mill is usually rated at three tons to each stamp, but the ore extracted from the Con. California and Virginia mine is very brittle, and mills running on it crush an average of over four tons to each stamp in a day of 24 hours.

in many others. The intent and spirit of the law is evaded. Hundreds of locations and relocations are made every year, upon which little or no work is done, merely for speculation. In nearly every camp the results of this are seen, and there is now a very decided opinion that some change should be made which will compel men to work their claims or give them up. It is not necessary for us to go over the ground of the defects in the law. The matter is well understood by the mining community. The change desired is one that will remedy the present defects. People should not be allowed to take up a lot of ground, let it lie idle a couple of years, let the location lapse, relocate, and repeat the process. A stop should be put to it. There is little doubt that another session of Congress will be allowed to pass without the present laws relating to mining being amended.

THE petition of the Sutro tunnel stockholders for leave to intervene a defense against the foreclosure of their property in the suit pending in the United States Circuit Court of Nevada, has been submitted to Judge Sahin. The court granted a stay of proceedings until March 2d, to enable counsel to submit further arguments.

THE quartz interest in and about Angels never looked more promising than at present. Prospectors are active and numerous.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EES.

The Cœur d'Alenes.

An Account of Several Idaho Camps.

EDITORS PRESS:—The Cœur d'Alenes at this season can boast of a large amount of "the beautiful." It has been snowing all winter, but only recently got down to business. The snow at present is three feet deep, and still snowing. Further up the valley they have six feet. The mining outlook for this section seems to be very brilliant. The Sullivan and Bunker Hill mines here are working their regular forces, and the concentrator turns out 30 to 35 tons of lead concentrates daily, averaging 70 per cent lead and 60 ounces silver. The total number of men employed is 80. The Bunker Hill does not look as well as it did two or three months ago, but the Sullivan, across the gulch, looks far better. These properties are now hooked to a pool of the Standard Oil Co.'s directors for \$600,000, and will undoubtedly be sold, when smelting works will be erected having a capacity of 100 tons daily. The Starn-Winder, Tyler and Richmond claims, on the same vein, are showing up fine ore bodies. The Sierra Nevada has 1000 tons sacked and ready to ship. The value of this ore is not high, but will pay handsomely. The Crown Point, over which one Fenian was killed and another wounded in October, is now being worked by the party in possession, and shows 12 to 14 feet of solid galena ore, high in silver. The Antimony mine at Pine Prairie and smelter was sold this week at sheriff's sale. The new narrow-gauge railroad from here to Cœur d'Alene Mission is a masterpiece of engineering. It takes two locomotives to pull three loaded cars carrying 10 tons each. The road is 13½ miles long; freight on ore \$5 to \$6 per ton, and passenger fare 14 cents per mile. The trains manage to make a round trip a day, leaving in the morning at 6 o'clock and returning some time in the night. The curves are so short that it is impossible for a car to pass over them at a speed of over two miles per hour without being derailed, while the grades stall a locomotive with two empty cars.

The mines up the river are looking exceptionally well. The California mine, owned by Scott McDonald, up Nine Mile, shows a large vein, with 12 feet of galena ore, averaging 60 ounces silver per ton. The Granite, at the head of Nine Mile, is showing immense ore bodies. The latter property is hooked to Portland people, and there is sufficient ore on the dump to pay for the mine.

At Lake Creek, 12 miles east, Lee George's big lead mine is developing a body of ore second to none. On Canyon creek the Tiger mine is being put in shape for sale, and while the ore is somewhat zincy and refractory, the quantity compensates for it, and it is probable it will ship 150 tons daily the coming season. The Extension, bonded by Noah Armstrong, shows an immense vein of high-grade galena, free from zinc. Nigger Prairie or Mullen still looms up. Mr. Hackett, the agent of Dennie Ryan, of St. Paul, proposes to put up a large concentrating plant on the Hunter, recently purchased, as soon as the weather permits. This mine has 65 feet of concentrating ore, 6 feet of solid galena and 1 foot of rich chloride ore. It is developed by a tunnel in the vein 400 feet and a depth of 300 feet. The Morning, the Evening, and a dozen other large veins assure the future of Nigger Prairie, or Mullen City, as it is called.

On the Murray side the lead property at Myrtle, lately sold for \$17,000, is being worked extensively by Messrs. Durant & Co. The Golden King now crushes 40 tons per day with their 10 stamps, and are saving a handsome margin above working expenses. The claims on Bald Mountain near Doctorville, named after the indefatigable dentist, Doc Smith, who stuck to them and showed what they were, are to be worked by eastern capitalists in the spring. The Mother Lode Co. is running its arastra above Murray and making money. The extensions east have two arastras and are earning handsome dividends. The Golden Chest has a bonanza of free-milling gold quartz, and when the new mill is completed in May, it will roll out a stream of wealth.

The Idaho mine, managed by Mr. Scowden, formerly of Nevada, has a 20-stamp mill built—lots of ore out, but there is some financial hitch and the mill has not started. The directors from Louisville are there investigating matters, and it is rumored Mr. Pettit, formerly superintendent of the Monarch mine, at Atlanta, this Territory, and now superintendent of the Golden Chest, is to succeed Mr. Scowden and the mill put in operation. The snow is now four feet deep at Murray and extensive placer mining operations are being prepared for.

Murray has a population of 2000 and a bright future. Wardner has 80 saloons, 3 dance-halls, 12 stores, 2 hotels and a dozen lodging-houses. The population is the standard mining camp crowd consisting of 10 per cent respectable people and 90 per cent saloonmen, gamblers, town lot jumpers and similar characters. While mining matters are quiet, the whisky element makes things lively.

MINER.

Wardner, Idaho, Feb. 5, 1887.

Pipe and Sewer Discharge.

In last February P. J. Flynn, C. E., read a paper on a modification of Kutter's formula given in Molesworth's "Engineers' Pocket-book" in this form:

$$C = \frac{181 + \frac{.00281}{s}}{1 + .026 \left(41.6 + \frac{.00281}{s} \right)}$$

And he proved that this value of C differed very little from a constant coefficient having the value of 85, so that

$$V = c\sqrt{rs} = 85\sqrt{rs}$$

Following the notation adopted by Mr. Flynn let

V = velocity in feet per second.

Q = discharge in cubic feet per second.

C = coefficient of mean velocity.

S = fall of water surfaces (h), in any distance (l), divided by that distance = $\frac{h}{l}$ = sine of slope.

a = area of cross-section of pipe or conduit.

p = wetted perimeter of pipe or conduit.

r = hydraulic mean depth in feet = area of cross-section of pipe or conduit in square feet divided by its wetted perimeter in lines

$$\text{feet } r = \frac{a}{p}$$

d = diameter of pipe or conduit.

n = the natural coefficient, the value of which depends on the nature and condition of the bed of the channel through which the water flows, or in other words, its degrees of roughness. In this case n = .013

In Van Nostrand's Engineering Magazine for September last a letter appears under the signature of Mr. Guildford Molesworth, C. E., the author of the "Pocket-book," and dated May 17th, from Simla, India, in which he says: Mr. Flynn's criticism of my modification of Kutter's formula for pipes has just reached me. Mr. Flynn is quite correct. The formula as it stands on page 25 (should be page 254) of the 21st edition of my "Pocket-book" has an omission of \sqrt{d} . As I had originally framed it, it stood thus:

$$C = \frac{181 + \frac{.00281}{s}}{1 + \frac{.026}{\sqrt{d}} \left(41.6 + \frac{.00281}{s} \right)} \quad (1)$$

And then he gives a table (given below) showing that the results, by his modification of the formula, differ very little from the results by Kutter's original formula. It is apparent that Mr. Molesworth has modified Kutter's formula in order to facilitate computations. Kutter's formula has this form:

$$C = \frac{41.6 + \frac{1.811}{n} + \frac{.00281}{s}}{1 + \frac{.013}{\sqrt{r}} \left(41.6 + \frac{.00281}{s} \right)} \quad (2)$$

In this formula $\frac{.013}{\sqrt{r}}$ is equal to $\frac{.026}{\sqrt{d}}$ as given in Molesworth's formula (1) and as n = .013, the terms $41.6 + \frac{1.811}{.013}$ is equal to 180.908. Mr. Molesworth has made this value 181, and, except this small change, the formula is identical the same as Kutter's, and requires almost as much work in computation.

Mr. Flynn, however, has given a modification of Kutter which simplifies and lessens the work of computation in a very material way. In this modification, the slope is taken as 1 in 1000, which gives a value of S = .001. For the slopes usually adopted in practice for pipes, sewers, conduits, etc., that is, for slopes not flatter than two feet per mile, or one in 2640, this formula will give velocities that, for all practical purposes, may be considered as almost identical with the velocities obtained by Kutter's formula (2). When the value of n = .013, as in this case, Mr. Flynn's modification of the formula is:

$$C = \frac{183.72}{1 + 44.41 \times \frac{.013}{\sqrt{r}}} \quad (3)$$

This, again, is further simplified by Mr. Flynn. The value of n having been fixed, in this case, .013, for the particular pipes or channel under consideration, a small table, including all the diameters likely to be used, is made out in the following shape:

Diameter.	Value of $\frac{.013}{\sqrt{r}}$
0 feet 6 inches.....	.03672
4 " " ".....	.01300
6 " " ".....	.00919
8 " " ".....	.00722
10 " " ".....	.00622
20 " " ".....	.00351

As an instance, we want to find the velocity in feet, per second, in a sewer, eight feet diameter, and slope one in 2600; then

$$V = c\sqrt{rs}$$

And in the above value of c formula (3) insert for $\frac{.013}{\sqrt{r}}$ its value, as given in the table opposite four feet diameter is. We have then:

$$C = \frac{183.72}{1 + 44.41 \times .00919} = 130.5$$

$$\text{And } V = 130.5\sqrt{rs} = 130.5\sqrt{2 \times .000384615} = 3.62 \text{ feet per second.}$$

This practical engineer engaged in carrying out the details of a large sewerage project or other work, requiring numerous computations, will appreciate the saving in time and labor to be gained by the use of Mr. Flynn's formula. Herewith is given the table which is included in Mr. Molesworth's letter, together with an additional column showing the value of c by Mr. Flynn's formula:

	Kutter.	Molesworth.	Flynn.
6 inch diameter, slope 1 in 40.....	71.5	71.43	69.5
6 inch diameter, slope 1 in 1000.....	69.5	69.79	69.5
4 feet diameter, slope 1 in 400.....	117.0	117.00	116.5
4 feet diameter, slope 1 in 1000.....	116.5	116.55	116.5
8 feet diameter, slope 1 in 700.....	130.5	130.63	130.5
8 feet diameter, slope 1 in 2600.....	129.8	129.93	130.5

This table shows the close agreement of the results by Flynn's simplified formula with Kutter's complicated and tedious formula. With the single exception of the six-inch pipe on a slope of 1 in 40, which is more applicable to a house-drain than a sewer, the results do not differ as much as half of one per cent, so that for all practical purposes Flynn's modification of the formula may be considered to give identical results with Kutter's formula. This is well illustrated in a volume of Van Nostrand's Science Series on the "Flow of Water," by Mr. Flynn, and lately published. In this work he gives a table of the discharge of sewers, which shows the great utility and saving of time by his formula.

In a late report on the sewerage of Washington, D. C., by Captain F. V. Greene, U. S. Engineers, a table is given of the discharge of circular sewers, computed by Kutter's formula (2). This table now given shows the discharge of the circular sewers, as taken from Capt. Greene's report, and also the discharge as computed by Flynn's formula:

DISCHARGE IN CUBIC FEET, PER SECOND.	Kutter.	Flynn.
10-feet diameter, slope 1 in 100.....	1673.66	1670.00
10-feet diameter, slope 1 in 200.....	1183.28	1181.49
10-feet diameter, slope 1 in 300.....	965.70	964.60
20-feet diameter, slope 1 in 100.....	10240.64	10255.90
20-feet diameter, slope 1 in 200.....	7240.13	7251.95
20-feet diameter, slope 1 in 300.....	5903.55	5921.24

The difference in discharge is so very small that the results as given by the rapid method of Flynn's simplified formula (3) may, for all practical purposes, be taken as identical with those given by the use of the troublesome and tedious Kutter's formula (2).

An inspection of the formulas (2) and (3) will show the great saving in computation that can be effected by the use of Flynn's formula (3). Exactly the same results as by formula (3) can be found by the much readier method of the tables published by Mr. Flynn in Nos. 67 and 84 of Van Nostrand's Science Series. The tables give a great saving of time, even when compared with formula (3), and even as a check on the formula they can be used with great advantage.

Flynn's simplified formula is applicable to any value of n. Thus, if we call the numerator on the right-hand side of formula (3) K, for any value of n, we have:

$$C = \frac{K}{1 + 44.41 \times \frac{n}{\sqrt{r}}}$$

And

$$V = \left\{ \frac{K}{1 + \left(44.41 \times \frac{n}{\sqrt{r}} \right)} \right\} \sqrt{rs}$$

In the following table the value of K is given for several of the most generally used values of n for pipes and other closed channels:

n	K	n	K	n	K
.009	245.63	.012	195.33	.017	150.94
.010	225.51	.013	183.72	.020	134.06
.011	209.05	.015	165.14	.0225	124.90

If, therefore, in the application of Flynn's formula (3) within the limits of n, as given in this table, we substitute for n its value and also the value of K, we have a simplified form of Kutter's formula. For instance, when n = .011

$$V = \left\{ \frac{209.05}{1 + \left(44.41 \times \frac{.011}{\sqrt{r}} \right)} \right\} \sqrt{rs}$$

IRON MOUNTAIN.—Of ore out, in sight, and that cut through by shaft and tunnels, it is estimated there is enough in view and assured to exist by the works already accomplished, to employ a mill and reduction works of medium capacity 20 years to reduce to bullion. The shafts and tunnels, so far as sunk or run, all penetrate through continuous bodies of paying ore and terminate in the same solid material. Therefore the full extent and astonishing immensity of this mastodon mine can only be conjectured, and left to the future for unfoldment. But with what is already thoroughly prospected, and estimated on the scale which the inferior grade ore yields by the present working process and machinery, the mine will at least yield \$400,000 worth of bullion per annum, which in 20 years of reduction would aggregate \$8,000,000. But it has already been demonstrated by a number of tests made by the working of several thousand tons of carefully selected ore from this mine at Swansea, England, and Denver, Colorado, that a yield of bullion can be confidently

expected from the best grade of ore, which, put through by the present mode of working and capacity of machinery employed, will give a result more than quadruple in value of the low-grade ore recently worked. Truly the boss mine of the State is located at our very doors, and we can soon number millionaires among our residents.—Shasta Courier.

For Coast Defense.

The text of the bills making appropriations for ordnance and sea coast defenses, as passed by the Senate, is as follows:

SECTION 1. That the Secretary of War be and is authorized to make contracts with responsible steel manufacturers, after suitable advertisements, to continue not less than 30 days in the newspapers most likely to reach the manufacturers addressed, for a supply of rough-bored, rough-turned and tempered steel, in forms suitable for heavy ordnance adapted to modern warfare, and steel finished for armor and other army purposes, in quantity not to exceed 20,000 gross tons, in quality and dimensions conforming to the specifications, subject to inspection and tests at each stage of manufacture, and including all parts of each caliber specified; provided that no money shall be expended except for steel accepted and delivered; that each such contract to erect in the United States a suitable plant, including the best modern appliances capable of making all the steel required, and of finishing it in accordance with the contract and agreement in the ordnance contract; to deliver yearly a specified quantity of each caliber, the time of delivery of the small caliber to commence at the expiration of not more than 18 months, and that of the largest caliber at the expiration of not more than three years from the date of acceptance of contract, and that all forgings shall be manufactured in the United States.

SEC. 2. That the Secretary of War be and is hereby authorized to erect at Watervliet arsenal, West Troy, N. Y., an army gun factory, in accordance with the report of the Gun Foundry Board of December 20, 1884, and for finishing and assembling guns adapted to modern warfare to the approved sizes, and for the manufacture of gun-carriage and ordnance equipment for the army at a cost not to exceed \$7,000,000.

SEC. 3. That for the purposes of the foregoing sections the sum of \$3,000,000 is hereby appropriated, out of any money in the treasury, not otherwise appropriated, to be available during the six years from January, 1887.

SEC. 4. That for the purpose of the construction of fortifications and other work, as coast defense, such as masonry and earthwork foundations for turrets, casemates and magazines, submarine mines and galleries, exclusive of armor, in accordance with the recommendations of the Board of Fortifications or other defenses, as appointed by the President of the United States, under the provision of the Act of Congress approved March 3, 1885, \$5,000,000 to be expended, per direction of the Secretary of War, is hereby appropriated.

The Senate has passed the bill to encourage the manufacture of steel for modern naval ordnance, armor, shafting and other naval purposes, and to provide heavy ordnance adapted to modern naval warfare. This bill is like the other in important particulars, except that the gun factory is to be at the Washington Navy Yard, and that the fourth section of the other is omitted.

Platinum.

Where Found, its Price and Uses.

Mr. P. H. Dunnagan, of Jamestown, and others, want to know the price, etc., of platinum.

The importers' price for refined platinum has risen steadily since 1883, when it was \$6.50 to \$7.50 per ounce, according to quantity bought. It is now worth \$7.50 to \$8.50.

The most important sources of platinum are the hydraulic mines at Nizhne-Taglsk, and Forgo-Blagodat, in the Ural mountains. About 80 per cent of the world's production comes from this source. Next in importance are the gold washings of the Pinto, in the United States of Colombia. About 15 per cent of the entire product comes from this source. It is also found in Brazil, Borneo, Hayti, Peru, India, Australia, and in the sands of the Chadiers river, in Quebec. It has recently been found in a quartz vein in New Zealand. The interest in the deposit lies in the fact of the extreme variety of platinum in place.

Platinum has been found in small quantities in various parts of this country, associated with free gold in placer deposits, but it is only from the placers of California that it has been produced in merchantable quantity, which amounts to between 100 and 200 ounces per annum, and is sold at 75 cents per troy ounce. It contains about 85 per cent of the metal, and is shipped to London to be refined.

The platinum used in this country comes almost entirely from Russia, and the imports amount to between 2000 and 3000 pounds annually.

Platinum "ore," as it is called, contains iridium, rhodium, gold, copper, and iron. It is sometimes, though seldom, found crystallized in cubes and octahedrons, but more usually in rounded or flattened grains, or "sand" having a metallic luster. It is very rarely found in place, but mixed with placer gold sands.

The principal consumption of platinum is in the manufacture of chemical apparatus, but, within the past few years, the use of incandescent electric lights, and also gas-jets, made luminous by a heated platinum spiral, have caused an increased demand for the metal, and the steady rise in price, during the past three years, may be referred to this cause.—Georgetown Courier.

The Anti-Dynamite Bill.

The following is the full text of what is known as the "anti-dynamite" bill introduced in the California Legislature by Senator Henry Vrooman, of Alameda county:

An Act to protect life and property against the careless and malicious use or handling of dynamite and other high explosives.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. It shall be the duty of each and every person, contractor, firm, association, joint-stock company and corporation manufacturing, storing, selling, transferring, disposing of, or in any manner dealing in or with, or using or giving out, nitro-glycerine, dynamite, vigonite, Hercules powder, giant powder or other high explosive, by whatever name known, to keep at all times an accurate journal or book of record, in which must be entered from time to time, as they are made, each and every sale, delivery, transfer, gift or other disposition made by such person, firm, association, joint-stock company or corporation in the course of business or otherwise of any quantity of such explosive substance.

SEC. 2. Such journal or record-book must show in a legible handwriting, to be entered therein at the time, a complete history of each transaction, stating the name and quantity of the explosive sold, delivered, given away, transferred or otherwise disposed of; the name, place of residence or place of business of the purchaser or transferee; the name of the individual to whom delivered, with his or her address, with a description of such individual sufficient to provide for identification.

SEC. 3. Such journal or record-book must be kept by the person, firm, association, joint-stock company or corporation so selling, delivering or otherwise disposing of such explosive substance or substances, in his or their principal office or place of business, at all times subject to the inspection and examination of the peace officers or other police authorities of the State, county, city and county, or municipality where the same is situated, on proper demand made therefor. Any failure or neglect to keep such book, or to make the proper entries therein at the time of the transaction, as herein provided, or to exhibit the same to the peace officers or other police authorities on demand, shall be deemed a misdemeanor, and punished accordingly.

SEC. 4. In addition to such punishment and as a cumulative penalty, such person, firm, association, joint-stock company or corporation so offending shall forfeit for each offense the sum of \$250, to be recovered in any court of competent jurisdiction by action at law. The party so instituting such action shall not be entitled to dismiss the same without consent of the court before which the suit has been instituted. Nor shall any judgment recovered be settled, satisfied or discharged save by order of such court after full payment into court, and all moneys so collected shall be paid to the party bringing the suit.

SEC. 5. Any person who, in the public streets of any highway of any county, city and county, city or town, or at, in or near to any theater, hall, public or private school or college, church, hotel or other public building, or at, in or near to any private habitation, or in, on board of or near any railway passenger train, or car, or tram, or cable road, or car of the same, or steam or other vessel engaged in carrying passengers, or ferry-boat or other public place where human beings ordinarily pass or repass, shall recklessly or maliciously have in his or her possession any dynamite, nitro-glycerine, vigonite, Hercules powder, giant powder, or other high explosive, or who shall recklessly or maliciously by use of such means intimidate, terrify or endanger any human being, is guilty of a felony, and on conviction shall be punished by imprisonment in the State Prison for a period not less than one year.

SEC. 6. Any person not regularly engaged in the manufacture, sale, transportation, or legitimate use in blasting operations or in the arts, of such substances as are named in this Act, shall be presumed (prima facie) to be guilty of a reckless and malicious possession thereof within the meaning of the foregoing section, if any such substance is found upon him or in his possession in any of the places or under any of the circumstances specified in the preceding section.

SEC. 7. No person may knowingly keep or have in his or her possession any dynamite, vigonite, nitro-glycerine, giant powder, Hercules powder or other high explosive except in the regular course of business carried on by such person, either as a manufacturer thereof or merchant dealing in the same or for use in legitimate blasting operations, or in the arts, or while engaged in transporting the same for others, or as the agent or employee of others engaged in the course of such business or operations. Any other possession of any of such explosive substances as are named in this Act is unlawful, and the person so unlawfully possessing it shall be punished by imprisonment in the State Prison not exceeding five years or by fine not exceeding \$4000, or by both such fine and imprisonment.

SEC. 8. Any person who maliciously deposits or explodes, or who attempts to explode, at, in, under or near any building, vessel or boat, railroad, tramroad or cable road, or any train or car, or any depot, stable, carhouse, theater, schoolhouse, church, dwelling-house, or other place where human beings usually inhabit, as-

semble, frequent, or pass and repass, any dynamite, nitro-glycerine, vigonite, giant or Hercules powder, or other high explosive, with the intent to injure or destroy such building, vessel, boat or other structure, or with the intent to injure, intimidate or terrify any human being, or by means of which any human being is injured or endangered, is guilty of a felony, and on conviction thereof shall be punished by imprisonment in the State Prison not less than one year.

SEC. 9. Any person, firm or corporation who shall take, carry or transport, or cause to be taken, carried or transported, any dynamite, vigonite, nitro-glycerine, Hercules or giant powder, or other high explosive, into the limits of or through or across any incorporated city or town of this State, or into, through or across any harbor for shipping, in any manner, condition or quantity, or otherwise, in violation of the laws or ordinances of such city or town, or of the laws or regulations governing such harbor, shall, in addition to the penalties provided or imposed by such laws, ordinances or regulations, forfeit to the State of California all such explosive substances, as well as the cases inclosing the same. Such forfeiture may be sued for by any citizen of the State, for himself and the State, and the goods or property, when so forfeited and recovered by judgment of the court, shall be sold and the proceeds divided, the citizen so suing taking one-half to himself for his own benefit and paying the other half into the State Treasury. Such action may be maintained in any court of competent jurisdiction, provided that the State shall never be liable to any cost or expense for any such suit or proceeding.

SEC. 10. Any of the forfeitures provided for in this Act may be taken advantage of and sued for and recovered by any peace officer or policeman of any city, city and county, or town, where the same arises for his own benefit, notwithstanding any law, ordinance or rule to the contrary.

SEC. 11. This Act shall take effect and be in force from and after its passage.

THE LONGEST TUNNEL IN THE WORLD.—An engineering work that has taken over a century to construct can hardly fail to offer some points of interest in its history, and illustrate the march of events during the years of its progress. An instance of this kind is to be found in a tunnel not long since completed, but which was commenced over 100 years ago. This tunnel, or at least as it should be more strictly termed, is at Schemnitz, in Hungary. Its construction was agreed upon in 1782, the object being to carry off the water from the Schemnitz mines to the lowest part of the Gran valley. The work is now complete, and it forms the longest tunnel in the world, being 10.27 miles long, or about one mile longer than the St. Gothard, and 2½ miles longer than Mont Cenis. The height is 9 feet 10 inches, and the breadth 5 feet 3 inches. This tunnel, which has taken so long in making, has cost very nearly a million sterling, but the money appears to have been well spent; at least the present generation has no reason to grumble, for the saving from being able to do away with water-raising appliances amounts to £15,000 a year. There is no further point, however, worth notice, for if we have the advantage of our great-grandfathers in the matter of mechanical appliances, they certainly were better off in the price of labor. The original contract for the tunnel, made in 1782, was that it should be completed in 30 years, and should cost £7 per yard run. For 11 years the work was done at this price, but the French revolution enhanced the cost of labor and materials to such an extent that for 30 years little progress was made. For 10 years following, much progress was made, and then the work dropped for 20 years more until the water threatened to drown the mines out altogether. Finally the tunnel was completed in 1878, the remaining part costing £22 a yard, or more than three times as much as the original contract rate.—*Engineering*.

AN ENORMOUS ARTESIAN WELL.—An artesian well, now being bored at St. Augustine, upsets many preconceived opinions about Florida. The well, which is 12 inches in diameter, is the largest artesian well in the world, and by actual measurement flows at the rate of 7,000,000 gallons per 24 hours. The well is now 760 feet below the surface, and is being deepened every day. A three-inch cable of the strongest material is used to hold the immense drill which is being used to sink the well. The old-fashioned idea that Florida was of a coral formation has of late years been vigorously disputed. The boring of this well proves that an immense depth of coral underlies the State, and samples of the material have been saved at every stage of depth, and for the last 550 feet the drill has been going through coral rock. Another interesting fact is developed, that the lower the well is drilled the higher the temperature of the water becomes. It is now about 80° F.—*Jacksonville (Fla.) Dispatch*.

THE SAN FRANCISCO & NORTH PACIFIC RAILROAD Company have just completed a new bridge across the Russian river at Healdsburg to replace the old wooden Howe truss-bridge which did duty there for a long time. The new bridge is a Pratt combination, with two spans of 193 feet each, and is built on concrete piers. Its strength was tested the other day by running three of the heaviest locomotives of the company across it. It was constructed from the design of Chief Engineer Frank K. Zook.

The Sastro Tunnel.

New York Capitalists Working for its Control.

A rumor that the Sastro tunnel property is about to be transferred to Eastern capitalists has been circulated among a few officers on Pine street. An attempt to trace the report to an authoritative source confirmed the news to a certain extent. It was learned by the *Chronicle* that in April, 1886, the holders of mortgages aggregating \$997,832.52, upon which interest amounting to \$650,000 had accrued, began suit in the United States Circuit Court at Carson, Nev., for foreclosure. Harvey Darnell, of this city, was appointed examiner, and, after several hearings, the testimony was transmitted to Carson. The present trustees were disposed to permit the mortgages to be foreclosed, but opposition to this mode of proceeding aroused the ire of the Eastern stockholders represented by Palmer and Lowengard, of New York, who were dissatisfied and wish to be represented by individual counsel. A motion was to have been heard in Carson recently, on proceedings for an intervention of adverse stockholders. The New York people pray for three months' time in which to prepare a defense to the action of the mortgagees. They make a showing of 165,000 shares of stock, although, as Secretary Ames thinks, they have large blocks of stock masked, which will be brought out when required. The mortgagees own the largest individual block of stock, and are claimed by the adverse stockholders to be playing into their own hands. McCalmont & Co., of this city, are the leading figures in the mortgage suit, and they controlled the elections for the last few years, whereby William Jones, David Cahn, Hugh Marshall, Charles W. Brush, Pelham W. Ames, Thomas P. Stoney and R. H. Pond were elected trustees. Mr. Pond died recently. Charles W. Brush is president of the Sastro Tunnel Company and Pelham W. Ames is secretary. The London, Paris and American bank (late Lezard Freres), of which Trustee Cahn is manager, is treasurer.

Until recently the 2000 shares of stock, which have a nominal par value of \$10, were widely dispersed among a very large number of holders. The value of the stock has fallen from \$6, at which figure it sold readily in 1880, to 18 cents, at which figure it was quoted in New York several days ago. The mortgage put on by the trustees represents money borrowed at 1 per cent a month from McCalmont & Co. The New York stockholders believe that the earnings of the company are sufficient to pay a reasonable interest on the investment, and have been quietly at work gathering in stock, and are believed now to be in a position to revolutionize the Board of Trustees at the annual meeting to be held next month. They are expected to elect their own officers and assume control of the company. Who will be made president, and what policy will be pursued, it is impossible to ascertain outside of New York. The company collects a royalty of \$2 a ton on all ore over \$40 a ton, and \$1 a ton on all ore under that figure taken from the Comstock lode, and averages \$24,000 a month income, with expenditures at \$5500, leaving a net income of \$18,500. It was rumored that John Mackay and J. C. Flood were in league with the Eastern capitalists and contemplated buying the tunnel, and this was regarded as indicative of a new bonanza; but Mr. Flood emphatically denied this. He assured the reporter that he had no pecuniary interests in the mines and would not consider any proposition looking to further investments in that direction.

FROM MINE TO MILL.—Mr. Jewett, the efficient superintendent of the Black Bear mine, on Squaw creek, has invented a cheap and effective method of transporting the ore from the mine to the mill, thus dispensing with the heavy-grade wagon road. The ore is run out of the tunnel and dumped into one or two cars that run on a tramway, which consists of a double-track road built on the side of the hill, with a grade of 30 degrees. From one car at the bottom of the tramway a rope passes up to and around a drum, and is then fastened to the other car at the top of the road; this one is filled with ore and started down grade, the loaded car hauling the empty car up ready for loading. The ore is then emptied into a bin at the end of the track and hauled on an easy grade to the mill, thus overcoming the one great obstacle to the successful prosecution of the work.—*Shasta Free Press*.

THE SALT LAKE DEMOCRAT inquires: Out of \$30,000 profit made by the United States in the coinage of silver since 1878, is it too much to ask that a few thousands more or less be expended in providing vault room for silver dollars, for which certificates of small denominations cannot be issued in sufficient numbers to meet the people's demand? The hue and cry raised by the gold bugs against this necessary expense, illustrates the folly of a penny wise and pound foolish policy.

MONTANA MINING STOCKS.—On the St. Louis stock board, mining stocks are called twice a week and always attract a crowd of investors. The principal demand is for Montana stocks, and Granite Mountain and Bi-Metallic are selling high up. Montana mines are so favorably regarded that it is hoped no citizen of this territory will ever consent to lend his name to

any scheme to float a questionable stock. Yet we learn that several such schemes are on foot on the east side of the range, where some absolutely worthless properties have been capitalized and are now being placed on the market. A good time to stop that sort of business is right now.—*Inter-Mountain*.

Machinery at the University.

In the College of Mechanic Arts, University of California, is the following outfit of machinery: The only machine in the State for testing the crushing strain of various materials is a prominent object. By the aid of this apparatus, the tensile and transverse strength of bricks, building stones, cements and wire can be ascertained by any person, free of cost. Its capacity is equal to 25 tons. A smaller machine stands in proximity to the larger apparatus, but its use is only applied in testing the strength of such articles as may be used in the laboratory. A seven-horse power engine stands in the laboratory, its power being utilized in making experiments. A series of cones, built up perpendicularly, furnish the means for adjusting helting in such positions that the results of different rates of speed can be determined. A tubular boiler in the rear furnishes steam for both the seven-horse power engine and a 15-horse power Ohmen engine. As the hours of work are limited during several days in the week, it would be very expensive were fires lighted to get up steam to drive the machinery upon such occasions. Economy has been studied and a gas engine of four-horse power runs the machinery on these off-days. A modification of the jet-pump has been applied by Mr. Sladky to an apparatus which makes water the motive power to obtain a strong blast upon a gas-jet or furnace. This blast is very useful in experiments, and would be highly appreciated by assayers and metallurgists. A furnace for melting brass and copper, with a steam hammer having a 50-pound drop, completes the equipment of the blacksmith's shop. The wood working machinery is located in a spacious room and comprises one hand, one circular saw, lathes and planers. In the metal-working department a lathe, a planer and a hand-drill may be seen, while the entire stock of tools necessary for cutting screws and gearing are ranged in cabinets on the walls. A very fine machine made by Mr. Sladky for cutting spur gearing for screws of various gradations is placed in a small room adjoining the machine shop.

BAND-SAWS are not made, in this country, to carry more than one blade, but we believe machines are made in England carrying two. A manufacturer recently said, referring to these saws, that he did not think they would answer for the lumber resaw in this country. In England, lumber is sent to the market in the form of deals, which are 2, 2½, and 3 inches in thickness, and 9 to 14 inches wide. These deals have to be resawn into thin material, and it usually requires several cuts to do this. Here, the greater part of the lumber is sent to the market 1 inch thick. A gang-saw is used very largely in England and on the Continent, while in this country it is seldom used, except in the large mills where they use gangs for sawing up lumber.—*Mechanical News*.

THE ANTELOPE MARBLE.—The marble recently discovered on the east side of Antelope Valley, about five miles east of T. B. Rickey's place, is thought to be very valuable. Last week, W. E. Lindsey, of the Reno Marble Works, who is one of the owners, went out to Antelope for the purpose of making arrangements for shipping a large quantity of the marble to Reno. The marble is of several colors, says the *Genoa Courier*, and works splendidly, taking an exceedingly fine polish. It has a very fine grain and is pronounced equal to the best Italian. Mr. Lindsey has procured an engine in Mason Valley, which he will place at the quarry, for the purpose of sawing the marble.—*Elko Free Press*.

MINING DISCOVERY.—S. J. Anderson and Chas. Nofsinger have discovered a lead in Winnemucca mountain, which they have named the "Standard Dollar." The lead is small, well-defined and rich, as far as prospected, the ore averaging \$100 per ton from the grass-roots down. The owners intend to ship a lot of it to the Reno reduction works in a few days. The lead is located in the south end of the mountain.—*Silver State*.

That there is a prosperous boom in store for Siskiyou county is evidenced by the large number of applications being made for timber and agricultural lands. Mining locations continue to be made at the rate of a dozen a week and immigration from adjoining counties has already begun.

It is estimated that \$150,000,000 of gold can yet be extracted from the Nevada county hydraulic mines. California will need that gold some day, and then the festive hydraulic picker will be in his glory once more.

IMPROVED GRAPE CRUSHING MACHINE.—W. H. Worth, of Petaluma, has perfected a machine to stem and crush grapes, which, it is claimed, will revolutionize that work at the wineries.



A. T. DEWEY.

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Passing Events.

The whole State has received an abundant supply of rain and snow from one end to the other. There has been some damage done by the storm, both in the North and South, and several shipwrecks; but, generally speaking, the whole coast has been largely benefited.

The abundant fall of snow in the mountains insures for the miners a good water supply this season. Although it can no longer be utilized for hydraulic mining, a great deal is now used for power at quartz mills, as well as for ordinary mining purposes, drift mining, etc.

A great many immigrants are now coming to this State to settle permanently, and thousands of excursionists or tourists are coming also. Most of them are going to the southern portions, but there is now more attention being paid to central and northern sections than heretofore. The whole State is having a very good "boom," and values are increasing everywhere.

The railroads are showing an increase of traffic in every direction on this coast, and are being extended in many places.

The San Francisco & North Pacific railroad has just completed their fine bridge over the Russian river, at Healdsburg. The bridge was constructed by the California Bridge Company, of Oakland. The structure is light, airy and beautiful, composed of wood and iron. The massive piers are of concrete. The bridge consists of two spans of 200 feet each. It was tested by a heavy train of engines, the deflection being very slight.

What Would Have Come of a Goldless California.

The Sutter-Marshall discovery of gold in California has had so much to do with this shaping of her subsequent career that one is prone to speculate as to what would have been the probable fortunes of this country had that event never occurred. Many there are who believe or affect to believe that California, by reason of her climatic attractions and her other natural advantages, would have become rapidly populated, and even made astonishing progress in other respects had no gold ever been found here. In support of this view we are reminded that a considerable emigration from the Western States had, as early as 1846, set in toward the Pacific Coast, and that California, having a little later come into the possession of our Government, that emigration would, in any event, have been swollen into large proportions. The people who arrived in the country at that day consisted mostly of families who, bringing with them their worldly all, came here to make permanent homes. They left the Western States because of the severity of the winters, the frequent failure of the crops, and the prevalence there of the fever and ague, a malady from which most of them had suffered terribly. Finding in California such entire exemption from these evils, it may well be supposed that these people entertained no purpose of ever going back to their old homes to reside. As evidence of this we are told that the immigrants who reached the country while it was still under Mexican rule, proceeded at once to obtain grants of land and settle upon them; they who arrived after the American occupation showing the same disposition to take up land and improve it for homesteads.

Very different was it with the immigration that arrived here after the discovery of gold. Few came to stay. During the 20 years following that event not 10 per cent of all who came to California remained permanently. As a consequence, while the arrivals were many, the fixed population of the State grew slowly. Substantial improvements were retarded, nearly everything being done in a hasty and slipshod manner. Extravagance, improvidence and waste prevailed. Even in public matters was this the case, few having the true interests of the State much at heart. Out of this condition of things grew lawlessness, crime and a generally low standard of morality. More than 40 years have passed since our people took possession of California, and yet the State contains to-day less than a million inhabitants. A growth of population this, over which we have little cause for the display of much enthusiasm. During these years the country, through the flow and ebb tide of immigration, has, of course, been filled and emptied of its inhabitants many times over. Still, the fact remains that California is, as regards population, outranked by many States of less importance.

So reason they who have little faith in gold as a promoter of good morals or solid progression. Now, while it is possible that affairs might have taken the fortunate turn above predicted, even though no gold had ever been found in California, the probabilities are that they would have resulted very differently. It may be admitted that these emigrants from the malarious West, once in California, would have remained here. Also, that the movement so begun would have been kept up for a long time, and perhaps even to this day. Then, too, the slight immigration from Mexico, Central and South America, the Hawaiian and other Pacific islands, already in progress, would, no doubt, have been continued, and perhaps augmented. That the ubiquitous Chinaman would, in good time, have put in an appearance, may well be supposed. The number of runaway sailors, constituting always in the seaport towns a considerable percentage of the foreign population, would have grown apace, while the Mormons, who had sought on this coast an asylum before the era of gold, would have arrived in larger numbers than they did had that event never occurred, inasmuch as it tended to defeat the object they had in coming here.

Beyond peradventure there would, by this time, have been gathered in California a large population, had the gold find at Sutter's Mill never happened. But, while so respectable in numbers, what sort of a people, let us ask, would have come of this strange agglomeration of races, the inferior so largely predominating?

What sort of a civilization would have been developed through this mixing up of the pure Castilian and the Indian-Spaniard with the Western Frontiersman, the Kanaka, the Mongolian and the Mormon? Little in the way of social, educational or industrial advancement could have been expected from a society so made up, there being present in this hybrid community too little of the American element to give shape and direction to public affairs or deeply impress American ideas on the institutions of the country. The native Californian with his few wants and his narrow ambitions being first on the ground and numerically in the ascendant, the habits and business methods of all would have largely conformed to his standard, the same "poco, poco" style of procedure obtaining under the new regimens as under the old order of things. Everything would have been performed in a slothful and dilatory way, nothing being done to-day that could be put off till to-morrow, and nothing being done at any time that could possibly be avoided. The country, instead of being filled up with a thrifty, enterprising, wideawake people, would have been sparsely inhabited by a listless, procrastinating, ease-loving race, who to any appeal for haste, if perchance such a thing could have happened, would have answered according to the established custom of the country, *manana, senor, manana*, everything going on as in the olden time with its *dolce far niente*—sweet laziness!

With a goldless California, San Francisco would have remained largely a city of adobes, with a single morning, and possibly an evening paper, not so much as one hebdomadal being issued elsewhere in the State; if, indeed, California would as yet have been advanced to the dignity of Statehood. Whether a railroad would have spanned the continent is problematical. Inland travel would, for the most part, have still been performed on mule and mustang back, few local railroads being built. Water transportation would have been carried on moeily with sail vessels, the ancient hide-droger plying about the bays and running up and down the rivers. Instead of producing almost everything and shipping annually to the extent of many millions, the chief products of the country would have been long-horned cattle and wild horses; its chief exports hoofs, hides and tallow. Although the farmer might not have continued to reap with a machete and plow with a stick, there would not probably have been seen at this day even so much as a single gang-plow or a machine reaper in all the land. In the absence of gold, the industries of California would have been few and of limited extent; the record of her productive achievements, brief and scanty. As the mud-built structure of primitive times contrasts with the palatial edifice of the present day, so would the civilization of the past have contrasted with that since planted here. Conflicts between peoples, united by the mosaic process without being socially commingled, would have been frequent and inevitable, keeping them in a state of constant turmoil and excitement, if it did not lead to internecine war.

In a community compounded of such different nationalities, each speaking its native tongue, a new and common language, adapted for carrying on ordinary intercourse, would have been evolved. This would have been unavoidable. What this common language would have been like, it is easy to divine; consulting precedent, there is reason to believe it would have much resembled the trade lingo established many years ago between the Hudson Bay Fur Company and the aborigines of the Northwest, this barbarous dialect, known as the "Chinook Jargon," having been made up from the English, the Indian and the Canadian French, all of which had, in the process of adaptation, been more or less corrupted.

The extent to which this dialect once prevailed in Oregon is denoted by the following experience had by a missionary sent to toil in that field of labor: Visiting a Sunday-school, the evangelist propounded a variety of questions pertaining to biblical personages and events, and received, as he tells us, the answers here given. "Who was Pontius Pilate?" "He was a hyass Tyhee in Jerusalem." "What did the Jews do to the Son of Man when He appeared among them?" "They memaloost him!" "From what did the Savior make the wine drunk at the marriage-feast of Cana?" "Made it from tum-tum chuck!" "With what did He feed the multitude when

they were abungered and had nothing to eat?" "Fed 'em on sapolill muck-a-muck." "What did Christ say to Satan when the latter sought to tempt Him on the mount?" "Said, wske clossh, klatawa skooknm," and so on through the entire category of questions and answers provided for the use of the Sunday-school teacher and his scholars.

The above shows how far this lingual abomination had at one time spread among the "Webfeet," the evil having been arrested in both Oregon and British Columbia by the discovery of gold in these countries. To a similar event was due also the check put upon this barbarism in California, and but for which it would, no doubt, have gone on growing and spreading, till both the English and Spanish tongues would have become debauched beyond recognition or recovery. In saving them from this shame our people owe to the great gold find a debt that has not always met with proper appreciation.

The State Mining Bureau.

We have received the two parts of the Sixth Annual Report of the State Mineralogist. They are issued at the same time, but separately. Part I is by H. G. Hanks, ex-State Mineralogist, and Part II is by Wm. Ireland, Jr., the present officer. This latter part is sent to the Governor by authority of the Trustees of the State Mining Bureau. The first part was apparently sent by the ex-State Mineralogist, and the Trustees do not appear to have had anything to do with it, as they have no report in the volume. Why there is more than one report we are not informed.

Mr. Hanks' report contains two maps, one of San Diego Co., and the other of Julian district, in the same county. They are large, colored lithographs. There is a chapter on "Building Stones and Building Materials in California." There is also a table of altitudes, most of it taken from the Bulletin of the U. S. Geological Survey. Then comes a chapter on "Mineral Springs in California," and one on the "Calistoga Silver Mines," with lithographs of views around Mt. St. Helena, Napa Co. Outside of this, the only mines spoken of in the book are those of San Diego Co., to which a chapter is given. The last 50 pages are devoted to an alphabetical descriptive list of California minerals, with localities. The whole report comprises 145 pages.

Mr. Ireland's report, which forms Part 2, comprises 222 pages. It contains the report of the Trustees of the Mining Bureau, with a summary of the needs of the institution. The most important chapter is the "Report of the State Mineralogist," which is an account of the leading mines in several counties, written by Mr. Ireland himself. This chapter contains more about mines and mills than any ever before published in any of these reports. It is not entirely satisfactory, because it should have been much more complete. However, Mr. Ireland explains this by the fact that it was impossible, with his duties in the Bureau itself, to give the time to this personal observation that was desired. There are several interesting diagrams and engravings in this chapter. The figures given of details of mining and milling are valuable.

Following this comes a brief chapter on bullion production, etc. Then the report contains a chapter on "Mine Drainage," illustrated; tables of weight of quartz mills, gold and silver; "Concentration of Gold and Silver Ores on the Pacific Coast," illustrated; and "Chlorination."

The remainder of the report is devoted to "Mineral Products of the United States," from the U. S. Geological Survey Report; the "U. S. Mining Laws," tables concerning water, and a great many pages from the code, giving the legal distances in the State. These latter portions may be possibly considered superfluous, but the previous parts of the book are so much more practical, from a miner's point of view, than these reports usually have been, that the "padding" may be forgiven.

The Trustees and Mr. Ireland may be congratulated on one thing, at least. They have made a beginning in collecting just such information as the mining community is after. There is nothing scientific in the report; there is very little about minerals. We have had possibly too much "science" and too much "minerals." The miners now want something about mines and about the machinery used in mining.

and milling. This, Mr. Irsan has tried to give them as far as possible. We believe had this plan been followed a few years ago, the Bureau would have been popular enough to have obtained a decent appropriation from the Legislature. The spectacle of mining men getting up in our legislative halls and working against an appropriation because they did "not believe the State Mining Bureau was any good to the mining industry," was very depressing to the friends of the institution. And unfortunately this influence was so great that the appropriation was cut down from a proper figure to a mere pittance. As it looks at present, the Trustees and State Mineralogist will be unable to carry out their plans of improvement, but will have to go on in the same old rut for awhile longer.

It is true the collection of minerals is growing, and the museum portion is all right. But it is the practical mining that must be looked after. We want a sort of "blue book" that people may have, which will tell them about where our mines are, what they are, how they are worked, and what things are used in working them. It is of the utmost importance that the collection of this sort of material be made. The actual existence of the institution, in fact, depends on it.

The present State Mineralogist, who has not been in office many months, shows by his report that he recognizes that the mining, milling and mechanical features require attention. It is unfortunate that this was not realized long ago. It is something which was often urged by the Bureau's friends. There should have been a Board of Trustees from the time of the organization. The plans laid out by the present Board, in summing up the "needs of the Bureau," in their report, were very good ones, and looked directly toward carrying out experiments of different kinds, making investigations, etc. But without more money than it is now proposed to give to the Bureau, none of this important work can be done. The proposed investigation would be of far more value than a mere collection or determination of minerals, and of much greater practical use to the miners of the State. It is very unfortunate that a sufficient appropriation has not been made to conduct the Bureau in a way that would give practical results.

Steam Engines and Pump Catechisms.

Robert Grimshaw, the author of several works of a similar character, has just published "The Pump Catechism." It is intended as a practical help to miners, owners, and makers of pumps of any kind, covering the theory and practice of designing, constructing, connecting and adjusting. The little work is sold for \$1. It is intended for practical pump-users. It describes the construction and operation of all the principal types and makes of pumps; how to take down, set up, adjust and run any single one of them. All prominent pump-makers in the United States were afforded opportunity to furnish data concerning the construction, operation and setting up of these pumps. As the title describes, the work is a "pump catechism," the information being given in the form of question and answer, all in such a simple manner that any one can understand the whole subject.

Only a short time since, Mr. Grimshaw issued his supplement, or Part II of his Steam Engine Catechism, which is sold for the same price as the above work. This contains no answer or question which appeared in the first volume. The character of the matter in Part II has been largely determined by the questions which the author received from engineers and others after the appearance of the first volume. The book comprises a series of direct practical answers to direct practical questions. It is mainly intended for young engineers and for examination questions. Formulas and mathematical gymnastics are avoided. The book is not intended for professional men, but is technically correct and up to date.

These works of Mr. Grimshaw are written simply, plainly and to the point. They are illustrated and printed in a size that may be carried in the pocket. They seem to be of a very practical character, and convey the information in a way not to be mistaken. The paper is good and print clear. They are of so low a price any one interested in the subjects can afford to have them. We shall in a few days have a supply of these works on hand, and can fill any orders for them at the prices stated.

Saving Fine Gold.

The Process Carried on at Snake River.

(Written for the Press by J. S. Hunt, of Hunt's Camp, Bliss, Idaho.)

In the issue of the Press of Jan. 8th, Mr. C. Beckmyer, of Blossburg, Montana, gives an illustration of a plan of saving fine gold, especially flour gold, the main points of which have been used on Snake river for 10 or more years, a description of which I give.

The gold where this system is used is all flour gold, none being found as large as the head of the smallest pin.

The manner of getting the gravel into the ground sluice used on the gravel bars here, is by surface ditches. The top soil is broken back with a steel bar, forming a narrow channel to the gravel, and then caved down by the

the water flows and prevents the sand from bagging under the hurlap sack, which must be tight and smooth, for if it bags or bulges, a large amount of sand gathers and not as much gold is taken up as when smooth. Twice a week in winter and three times per week in summer the sacks are taken up and washed, the sand under the sacks cleaned up, the box washed off, and the drippings caught in a box hung on the lower end. Under the sacks, properly put down, there are from two to three ordinary gold pans of sand, mostly black, with some gold in it. The most of the gold, however, is found in the hurlap sacks. We use 7½ ounce, 40 inches wide hurlaps.

We here rock up the concentrates on a copper plate 16x60 inches set with quicksilver, and when sufficient is on the plate it is scraped with a knife. With us electroplated plates do not

to catch the water and sand passing through holes in grizzlies and conveying to cross-box No. 3, which is arranged so as to divide the water as near as possible into six equal parts. The cross-box at 6 slopes each way outward with the grade of ¾ inch to foot.

No. 4 represents openings in bottom of No. 2 so as to separate the water for each sack-box.

No. 5 is the head of machine, or flume, from the ground sluice, which is two feet wide for some distance to within about six feet of the first grizzly-plate, when it opens out to the width of the machine.

No. 3 shows continuation of cross-boxes leading to three sack-boxes on each side of machine leading to No. 7, where the water is turned out to the sack or hurlap-boxes No. 8, and is divided by the wings 000, Fig. 4, as many as are desired to secure an even flow of water over the hurlaps.

No. 9 represents the strip of cotton duck and strip of wood across to hold the head of the hurlaps in place.

XXX represents gates or slides to shut off the water while cleaning up a box, which is done one at a time, so as not to interfere with the flow of water over the machine.

In setting up the machines, the grizzly-frame (No. 1) should be set loosely on the frame, holding No. 2 with a grade of ¾ inches to foot, but so arranged that by wedges it could be raised to a grade of ¾ to foot, according to the nature of the soil and gravel to be run. We find ¾ inch to the foot the best grade. The sack or hurlap-boxes, No. 8, should be so set that they would have ½ inch to foot grade, and could be raised to but ¾ inch to foot, which we find best adapted to our use.

The sack-boxes are 3x24 feet long and six in number. We use from 200 to 250 miners' inches to each machine, and on a monthly run we average not far from 300 cubic yards to each machine every 24 hours. With the above-described machines we can, on gravel that averages five cents per cubic yard, have a margin of one-half profit.

In setting up a machine, great care must be taken to secure a good dump, or the machines will soon choke up.

I hope that the foregoing will be of some benefit to some of your readers in the fine or flour-gold districts. I can assure them that a large number of machines of this description are in daily use on Snake river, Idaho.

Legislative.

The Legislature has been pretty busy of late and has considered a number of bills. The Vrooman anti-dynamite bill we give on page 123 as amended. We referred fully to this bill last week, and the injustice it would do to powder manufacturers without accomplishing the object sought. The best way to stop the dynamite outrages is to punish the perpetrator. Three of these men caught in the act of exploding cartridges, or with the dangerous material in their possession, are now in jail.

The joint Committee on Mines, Drainage and Mining Debris have been this week listening to arguments on Varrel's Assembly bill and Walrath's Senate bill, providing for the impounding of mining debris. Large delegations from Yuba and Sacramento counties, representing the mining and farming interests, were present. We have given this bill in full, and it is to be hoped that the miners will have a chance to take the steps provided for in the bill. They can impound their debris if they are given a chance to do so. There will be a strong fight on this bill.

Langford's bill, providing for the repeal of the Act creating the office of State Engineer, was reported favorably, with an amendment that it shall not take effect until the next fiscal year.

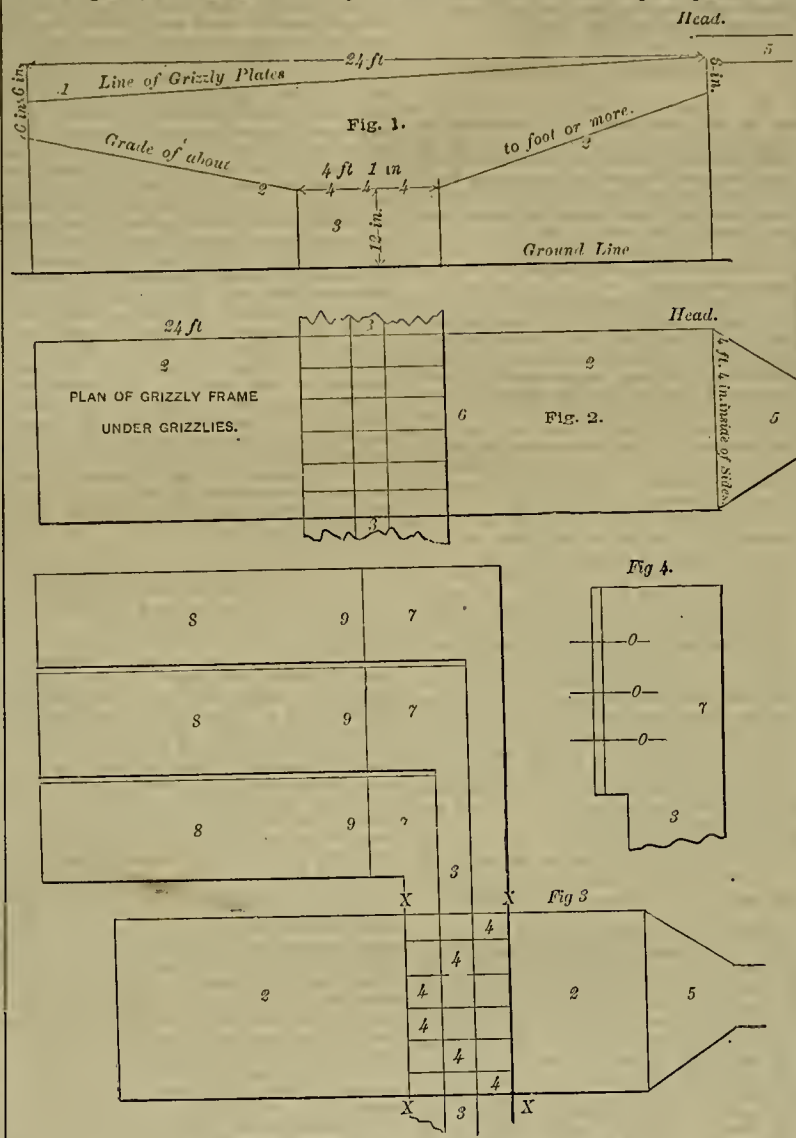
There is great rejoicing among all connected with the State University over the passage by the Legislature of the "One-cent Act."

The manufacturers here condemn the Assembly bill requiring all articles to be stamped with the manufacturer's name.

Lewis' bill, creating the office of Inspector of Elevators, was recommended for passage by the Committee on Internal Improvements.

Oil men here are opposed to the appointment of an oil inspector. It is said that in this city alone fees of \$70,000 a year would have to be paid to the official appointed, as the Act now reads.

There is a measure now before the Legislature creating a State Analyst, which takes the duty of making certain analyses out of the hands of the University Professor who now has it.



MACHINE FOR SAVING FINE FLOUR GOLD.

action of the water. The lumps of soil are broken with a light pick. Direction to the water in the pits is given by shear boards. One man will harrow down enough ground in 10 hours to keep a 4x24-foot machine running 24 hours. Twenty-four feet has been found to be the best length for the grizzly, the frame varying in width from one to four feet, according to the amount of water and kind of ground to be run. Most of the machines in this locality have the width of four feet, and are composed of eight iron plates, each 3x4 feet, which are perforated with holes ½ inch between centers. The holes are punched tapering, the largest part on the bottom side so as not to clog with fine gravel. The gravel and coarser sand pass over the grizzly-plates to the dump, while the fine sand, black and gray, together with the gold, passes through the holes with a portion of the water and flows over a series of tables six in number, on which is stretched burlaps, held in place on the sides by strips held down by buttons made in the form of an eccentric. At the head of the table, or, as we call them, "sack-boxes," is placed a strip of heavy cotton duck about as coarse as the cotton grain-sacks. This is about 15 inches wide and as long as across the box. Across the top is a strip 2½ inches wide by ¾ thick, over which

work satisfactorily, as the plating soon scrapes off. A little cyanide of potassium is used, and after the plate is once set a pound of quicksilver will last a long time. We have not used 10 pounds in a year. All we lose is what is lost in retorting, which is but a nominal amount, and after retorting it is condensed and used over again, and we get very near all the gold out of the concentrates. After rocking they are thrown in a pile. Out of curiosity, I took a shovelful from different parts of the pile, cut and quartered it after the manner of ore-sampling, and sent the sample to the best assayer in the Wood River country. He reported that there was \$2 per ton in it. This was dry sand. Some of our gold under the glass shows a coating of some kind of cement which requires heat or friction to remove, so we save as large a per cent of the gold as is usual.

I give you plan and sectional views of a 4x24-foot machine, such as is used on this claim and along Snake river. The same figures refer in all views to the same parts. Fig. 1 is a section of machine 4x24 feet, with one side removed. Fig. 2 is a plan of grizzly-frame under grizzlies.

The following is the description of sketches in Figs. 1 and 2: Fig. 1 shows grizzly-plates resting on frame; 2 shows tank or sand-boxes

MECHANICAL PROGRESS.

Welding by Electricity.

Exhibition of the Process in Boston.

For the second time, within a comparatively few years, says the *Boston Herald*, a new discovery in electricity has been publicly shown first before the Society of Arts connected with the Institute of Technology of that city. Last evening Professor Thomson, of the Thomson-Houston Company of Lynn, made known to the public his new and remarkable method of welding. Up to the present the process of welding has been confined within narrow limits, the metals upon which it could be practiced being few. By the new method a broken bar of metal can be easily reunited, or bars of different metals welded together, and those metals which previously resisted welding most strenuously are now joined with ease, while those previously easily welded remain the same by the new process. Differences in specific, electrical and heat conductivity are the properties which are most troublesome. The method consists in simply forcing the ends to be welded together tightly and passing a sufficiently powerful current of electricity through the joint. The resistance raises the metal to a welding heat and this pressure makes the joint. The speaker enumerated some of the practical results obtained personally within a recent period. Iron and copper wires of various dimensions have been joined end to end. Steel or iron bars nearly an inch in diameter have been solidly welded together, and steel has also been joined to brass. A copper rod nearly one-half an inch in diameter has been welded, requiring a current of 20,000 amperes. Steel-pointed tools may be cheaply made of inferior metal and new points welded on as desired.

The cost of the new process is undoubtedly less than by the old method of forge and hammer, while the time required is very short and no heat is wasted. Mr. Thomson stated that in welding a steel bar one and one-half inches in diameter, a current of 6000 amperes in volume and having an electro-motive force of one-half a volt, was necessary. The use of 35-horsepower for one minute is another way to state it. The apparatus and methods are fully covered by patents, and can, of course, be used only by permission of the inventor, Professor Thomson.

Progress in American Locomotive-Building.

In a long and interesting letter that lately appeared in *Engineering*, continuing the discussion on English and American locomotives, from the pen of John Fernie, the following remarks are made:

During 16 years I have seen the most wonderful progress.

1. The Westinghouse brake was then in its infancy; now it is automatic and is known all over the world.

2. Steel fire-boxes were only experimental 16 years ago. Now they are universal on this side of the Atlantic.

3. The power of the engine has been immensely increased, while its cost has been much reduced.

4. The mileage of the engines has been nearly doubled, and the full value of duplicate engines proved.

5. Dining, buffet and parlor cars have made traveling by limited trains as sumptuous as royal trains in Europe; while in ordinary trains the size of carriage and the comfort and convenience of passengers have been largely increased.

6. Wagons (cars) which then only carried from 10 to 15 tons are now being increased to carry 30 tons.

7. All this has been accomplished with a great reduction of freight and passenger rates.

Now, can you point out to me any improvements in English or Irish railways corresponding to this? Further, the American engine has supplanted the English engine in Canada and is threatening to do so in the colonies. Can there be any doubt that the English engine is doomed soon to extinction, and that the American engine will take its place? And I say the sooner the better, for its use will bring better dividends to suffering shareholders and more trade to English locomotive-builders.

How Iron Breaks.

Hundreds of existing railway bridges which carry 20 trains a day with perfect safety would break down quickly under 20 trains per hour, writes a British civil engineer. This fact was forced on my attention nearly 20 years ago by the fracture of a number of iron girders of ordinary strength under a 5-minute train service. Similarly, when in New York last year, I noticed, in the case of some hundreds of girders on the elevated railway, that the alternate thrust and pull on the central diagonals from trains passing every two or three minutes had developed weakness which necessitated the bars being replaced by stronger ones after very short service. Somewhat the same thing had to be done recently with a bridge over the river Trent, but the train service being small the life of the bars was measured by years instead of months. If ships were always among great waves, the number going to the bottom would be largely increased. It appears natural enough

to every one that a piece, even of the toughest wire, should be quickly broken if bent backward and forward to a sharp angle; but perhaps only to locomotive and marine engineers does it appear equally natural that the same result would follow in time if the bending were so small as to be quite imperceptible to the eye. A locomotive crank axle bends but one-eighth of an inch, and a straight driving-axle a still smaller amount under the heaviest bending stresses to which they are subject, and yet their life is limited. During the year 1883 one iron axle in 50 broke in running, and one in 15 was renewed in consequence of defects. Taking iron and steel axles together, the number then in use on the railways of the United Kingdom was 14,848, and of these 911 required renewal during the year. Similarly, during the past three years, no less than 228 ocean steamers were disabled by broken shafts, the average safe life of which is said to be about three or four years. Experience has proven that a very moderate stress, alternating from tension to compression, if repeated about 100,000,000 times, will cause fracture as surely as a bending to an angle repeated only 10 times.

Action of Oils on Metals.

The *Journal of the Society of Chemical Industry* recently gave some very interesting data regarding the action of oils in common use upon metals, as they are brought in contact by storage, transportation and employment in the lubrication of machinery. The experiments were continued for 12 months, and are of much practical value. They were made principally with a view to determine what fixed oils are best adapted for mixing with mineral oils for lubricating purposes.

The metals were first thoroughly cleaned and then washed with ether and dried, and after being weighed were placed in cork tubes, together with the oil; the tubes being kept for 12 months at an average temperature of about 80 degrees Fahrenheit in the winter. The results of the experiments show that iron is the least affected by seal oil, and most by tallow oil. Brass is not affected by rape oil, least by olive oil, and most by cottonseed oil. Lead is least affected by olive oil and most by whale oil; but whale, lard and sperm oils all act to nearly the same extent on lead. Zinc seems, by the four actual weighings that were of any value, to be not acted on by mineral lubricating oil, least by lard oil, and most by sperm oil. Copper is not affected by mineral lubricating oil, least by sperm oil, and most by tallow oil. Mineral lubricating oil has no action on zinc and copper, acts least on brass and most on lead. Olive oil acts least on tin and most on copper. Rape oil has no action on brass and tin, acts least on iron, and most on copper. Tallow oil acts least on tin and most on copper. Lard oil acts least on zinc and most on copper. Cottonseed oil acts least on lead and most on tin. Sperm oil acts least on brass and most on zinc. Whale oil has no action on tin, acts least on brass, and most on lead. Seal oil acts least on brass and most on copper.

From the foregoing results it will be seen that mineral lubricating oil has, on the whole, the least action on the metals experimented with, and sperm oil the most.—*The Wood-Worker*.

THE PHYSICAL PROPERTIES OF MANGANESE STEEL.—At a scientific meeting in Dublin, Prof. Barrett read a paper on the above subject. He said this steel was a new-manufactured product, patented by Messrs. Hadfield & Co., of Sheffield, and possessed several remarkable properties. It had hitherto been considered that manganese was an injury to steel. In small proportions this doubtless was the case; but when the proportion was increased by 10 or 15 per cent, the steel produced had great hardness and tenacity. Moreover, it did not require hardening or tempering, but could be used direct from the casting. Heating this steel to whiteness, and quenching it in cold water, annealed it; whereas, ordinary steel, as was well known, was rendered hard and brittle by this process. But the most remarkable property possessed by manganese steel was its extraordinary magnetic inertness. The professor showed by experiments that manganese steel was practically non-magnetic, and said for this reason it was likely to become a most important material for the construction of iron ships. The large deviation of the compass on iron ships, which was so often the cause of serious accidents, would not exist on ships built of manganese steel, with cables and anchors of the same material. The professor concluded by stating that his attention had been called by a correspondent to the large deposit of manganese in the county of Wicklow, from which a tough and fibrous iron had been made.

STEAM ENGINES.—There are some engine vendors who advertise their engines, much after the manner of patent medicine vendors, as the very best for all purposes. Mr. Grimehaw expresses his opinion of such in the following manner: "There is no such engine as the 'best for all purposes.' I doubt very much whether the maker of any engine seriously claims it. All depends on the amount and class of work, the kind of boiler, the kind of engine, and lots of things. It would be perfectly folly for any one to put in a high-grade automatic cut-off engine for a plantation sawmill, where the engine would be started and stopped by whoever happened to be handiest to the throttle, and where repairs would be made with wire, and lath, and ignorance."

SCIENTIFIC PROGRESS.

The Resistance of the Atmosphere.

From Professor Langley's illustrated papers on "Comets and Meteors" in the *January Century*, we quote as follows: Everybody has noticed that if we move a fan gently, the air parts before it with little effort, while, when we try to fan violently, the same air is felt to react; yet if we go on to say that if the motion is still more violent, the atmosphere will resist like a solid, against which the fan, if made of iron, would break to pieces, this may seem to some an unexpected property of the nimble air through which we move daily. Yet this is the case, and if the motion is only so quick that the air cannot get out of the way, a body hurled against it will rise in temperature like a shot striking an armor-plate. It is all a question of speed, and that of the meteorite is known to be immense. One has been seen to fly over this country from the Mississippi to the Atlantic in an inappreciable short time, probably in less than two minutes; and though at a presumable height of over 50 miles, the velocity with which it shot by gave every one the impression that it went just above his head, and some witnesses of the unexpected apparition looked the next day to see if it had struck the chimneys. The heat developed by arrested motion in the case of a mass of iron moving 20 miles a second can be calculated, and is found to be much more than enough, not only to melt it, but to turn it into vapor; though what probably does happen is, according to Professor Newton, that the melted surface portions are wiped away by the pressure of air and volatilized to form the luminous train, the interior remaining cold, until the difference of temperature causes a fracture, when the stone breaks and pieces fall—some of them at red-hot heat, some of them, possibly, at the temperature of outer space, or far below that of freezing mercury. "Where do these stones come from? What made them? The answer is not yet complete, but if a part of the riddle is already yielding to patience, it is worthy of note, an instance of the connection of the sciences, that the first help to the solution of this astronomical enigma came from the chemists and the geologists."

COLD IN THE ABSTRACT.—A contemporary takes a somewhat humorous view of the scientific expressions for heat and cold as follows: Scientists tell us there is no such thing as cold; that heat and cold are relative terms, and that cold is merely the absence of heat. Mathematically expressed, then, heat is a plus quantity and cold a minus one, and, metaphysically speaking, one is a positive entity and the other a negative abstraction. All this is very well, but to a man with frosted ears or acute chilblains it is sounding brass and tinkling cymbals. In like manner scientists assure us that the terms up and down are merely relative, but the man who slips up and falls down knows better. No more does it help a man who is stumbling around in the darkness to assure him that there is no such thing as darkness—that it is merely the absence of light. If he feels his nose against an open door or bruises his shin over a dislocated chair, it hurts him just as bad as if darkness were a positive quantity, and in his heart of hearts he believes it is. Recurring to the case of cold versus heat, which just now is one of current interest, we respectfully submit that the scientific definition of the term cold, or the other term either, has little to do with its practical application. If a scientist's ears are nipped one of these cold mornings what matters it to him whether they are dephlogeticated or frozen? Whether the result is reached by the withdrawal of heat or the application of cold does not make much difference to the man with the frozen ears. They pain him just as much as if cold were a positive instead of a negative quality. The philosopher who, with the thermometer below zero, should apply his tongue to a street-lamp post or a water hydrant might get a great deal of personal satisfaction by explaining that the mutilation of his tongue was due to a sudden abstraction of heat, but every newboy and street-gamin would know that it was caused by the cold.

EXTINCTION OF AFRICAN GAME.—Nothing can convey a better idea of the astounding rapidity with which the nobler game are being cleared from the face of the earth, and especially in South Africa and North America, than a chat with a London hide-broker, or a visit to the crowded leather warehouses and wharves of Bermondsey. A firm of hide-brokers has for some two or three years past had an standing order to obtain in one lot, for some continental clients, 500 quagga skins. Ten years ago such an order could easily and rapidly have been executed, but now it is an impossibility, for, instead of arriving as they used to in hundreds and thousands from South Africa, quagga hides now only appear in dribble of from 10 to 30 at a time, and then principally from the Zanzibar coast. In fact, the rolling plains of the Orange Free State and the High Veldt of the Transvaal, whereon the quagga, in company with wildebeeste (gnu), blebokke, springbuck and ostriches, formerly grazed in countless thousands, are now absolutely denuded of these beautiful creatures, and their ancient habitats know them no more. With the introduction of breech-loading weapons the Boers began a war of extermination upon the fauna that formerly

imparted an air of grace to many a dreary landscape, and the laden wagons of the "skin-hunters" rolled incessantly to Port Elizabeth and other markets. Then English hootmakers made the discovery that the hide of the black wildebeest and the quagga, particularly the latter, made the finest quality of so-called porpoise hide, now much in request for walking hoots. The new demand completed the ruin of these quadrupeds, which are now all but extinct south of the Tropic of Capricorn.—*London Globe*.

THE DATE OF DEATH.—M. Megnin claims to be able to determine the date of death by studying the generations of acarina, which have been at work upon the body. Brouardel produced the cadaver of a young woman before the French Academy of Medicine, which had lain in a cellar for a year. He was able to trace five different species of acarina, and the order of succession and duration of each species. One species consumes the fatty acids, another absorbs the fluids, and each dies when its work is ended. The period of life of each in summer is from six to eight weeks. In a case of murder in which the remains of the victim were discovered in a garden, Megnin was able to establish the date of burial with great accuracy. The value of these observations and deductions, if confirmed, cannot be overestimated, as barely a month passes without the discovery of a murdered body, and in the course of the prosecution the probable date of death is always an important factor. So far as we know, no one has taken up this work of Megnin, Brouardel, and Laboussiere in this country, yet it would seem that no field offers more inducements to the medico-legal expert than the one just opened by these enterprising French savants.—*Science*.

DEVELOPED FORCE.—"Force," says Prof. Pierce, "seems to have a spiritual origin." Its actual nature, science has not determined. We recognize the existence of force through the observed effects it produces. Force is the universal cause of change, always operating in connection with matter, and ever persistent in maintaining its integrity, so that the sum of its efforts is constant. It is developed in various forms—as in attraction and repulsion—in motion and its equivalents, heat, light, electricity and galvanism. It acts upon the atom, molecule, particle, body aggregate, world, sun and systems. Developed as heat from the sun, force lifts the waters to the clouds, whence, by the force of gravity, they descend to earth and flow as a mechanical power in their course back to the sea. Also coming in the forces of heat and light from the sun, force induces vegetation and builds up forests. These, in the cycles of change, are prostrated and buried for ages, but in their sepulcher embrace their parent force, which, in the meantime, transforms them into coal, from whose combustion it rises Phoenix-like, in all its integrity and pristine energy.

THE RINGS OF SATURN.—The constitution of Saturn's rings, and questions connected with them, are now prominent themes for the attention of the men of science. Opinion is divided about a dark line in the outer ring, whether it be produced by a darker shading of the ring or whether it be the sky beyond showing through the opening. If a star or other object should be seen through the dark spaces, the question would be settled. Some astronomers of note think that the rings are approaching the planet. Measurements of exceeding delicacy will be required to establish this theory. Saturn's oppositions will afford the best conditions for seeing stars in the dark spaces between the rings, and finding if the distance lessens between the body of the planet and the rings. One only needs to look at this wonder of the skies through a good telescope to realize, in some faint degree, the practiced hand, the delicacy of vision, the activity of brain and the profound scientific preparation required for a solution of either problem.—*Providence Journal*.

HOW TO CURL AN OSTRICH PLUME.—Have ready some corn cobs and common salt, and let the fire in the cook stove burn down till you have a good bed of coals, lay the cob on and sprinkle them with salt, and shake the feather in the smoke. Add cobs and salt from time to time, and be sure to shake the plume well, turning every part to the smoke. The harder you shake the feather the better it will look. Be careful to keep it far enough from the fire to keep it from burning. The livelier the coals without blaze the better. I have tried to make this plain. I thought my plumee completely spoiled till I tried this receipt. I saw a milliner wash a white plume once and recurl it this way, and it looked as nice as new. She washed it in lye and rinsed it in clear water, and shook it vigorously until about dry, and then shook it over the smoke.

THE HEATING VALUE OF COAL.—Although instruments for the precise estimation of most of the agents of our industries have long been introduced, the heating value of coal—the great natural source of power—is rarely tested calorimetrically, even by the largest consumers. At present the different qualities of coal are known as firsts, seconds, etc., whereas a calorific estimation might show that the seconds, or even inferior qualities, possessed a higher calorific efficiency than the firsts. By the utilization of fuel calorimetry a user of coal may be able to ascertain exactly the financial value of different fuels, and to compute the heat energy possessed by the fuel with that economically evolved.

County Boundaries.

The Committee on County and County Boundaries of the Assembly has decided to allow the people of the section proposed to be divided from Colusa county to vote on the question. This will probably result in a division of the county. Colusa county contains 2300 square miles and is larger than either the State of Delaware or Rhode Island. There is considerable rivalry existing between the towns of Colusa and the Willows, in the northern part of the county, but should the citizens of the aforesaid section conclude to separate, it will doubtless be owing to the fact that their interests can be more conveniently and economically served thereby. The chief interest that gravitates around this local agitation, should it result in a division, is the probable effect it may have as a precedent. Other counties may catch the division fever. In point of size, California is the second State in the Union, containing 155,000 square miles, and yet has only 52 counties, while New York has 60, Ohio 88, Virginia 100, Kansas 104, Missouri 114 and Texas 179. Only those who have taken pains to study their geography are aware of the territorial extent of some of our counties. San Bernardino has an area almost equal to that of West Virginia. The following table may give our readers an idea of the extent of some of our larger counties:

Counties.	Square Miles/Land Surface.	State.	Square Miles/Land Surface.
Fresno	8,094	Connecticut	4,845
Humboldt	4,094	Delaware	1,960
Inyo	10,156	District of Columbia	60
Kern	8,100	Maryland	9,860
Lassen	4,750	Massachusetts	8,049
Los Angeles	4,812	New Hampshire	9,005
Modoc	4,297	New Jersey	7,455
San Bernardino	21,172	Rhode Island	1,085
San Diego	14,959	Vermont	9,135
Siskiyou	6,078		
Tulare	6,406		

It is a little rough to compel a man to travel from 60 to 100 miles to put a deed on record or attend court as a juror or witness. This inconvenience may be patiently endured in a thinly settled county, but as the population becomes dense and business at the county seat increases, it would not be strange if the people became uneasy and demanded more compact county facilities.

Calaveras County Mines.

Probable Reopening of the Gwin Property.

The Calaveras Prospect of a recent date says: One of the latest and most striking evidences that our county is to have a renewal of prosperity that will far eclipse anything Calaveras has yet experienced, is the almost entire certainty of the reopening of the Old Gwin mine. This property proved one of the best paying investments in the county till shut down on account of the formation of the walls being such as to cause fear of their caving without a different system of timbering. To make this necessary change would entail a heavy expense, therefore making it especially worthy of note that men of means have sufficient confidence in the staying qualities of our quartz lodes to make this necessary outlay before solving the hidden mysteries of this mine, which will be seen by the subjoined extract has already been worked to a considerable depth. Further reasons for our belief in the brilliant future of gold mining in this county are based on our knowledge of the immense quantities of low-grade ore that the surrounding hills contain, and the study rich corporations and private capitalists are making of the most recent inventions for extracting the precious metal at small cost. We no longer need to have ore in which free gold is seen to hang to feel confidence in it being pay rock. Beside these indications is the one on file at the county clerk's office—mining locations. There has never been a time in the county's history when the prospecting and locating equaled what to-day's records show. Develop your prospects so as to show to capital what you have, and you may be assured that you will have little difficulty in disposing of your property at a fair price. The following we clip from the Calaveras Chronicle of January 29th:

"A Mr. Conzelman, of St. Louis, arrived here last Monday evening and remained two or three days. We learn that the gentleman named had come to get information concerning the Gwin mine, in the interest of a company to which he is to report the result of his investigations. In the absence of Mr. W. M. Gwin, who is the owner of the mine, and who is at present in the East, Mr. Conzelman sought information from responsible parties, visited the mine, and spared no pains to ascertain all the facts, interviewing the men who had been at work in the mine just previous to its closing down. Although we have no assurances of the matter, the prospects are that in the not distant future there will be operations commenced on this valuable mine. That it is a valuable piece of mining property, explorations have proven. The shaft reaches a depth of over 1500 feet, with a splendid body of paying ore, and the requisites are heavy appliances in the way of machinery to reundertake the work."

Further information of negotiations confirms the belief that the reopening of the mine by the St. Louis company is a settled fact.

USEFUL INFORMATION.

The Trade Dollar.

A cotemporary furnishes the following facts in regard to that much-abused coin—the trade dollar: The trade dollar has no monetary value, although by an oversight in the bill authorizing its coinage it was made a legal tender like other silver dollars to the amount of \$5. Not being a Government coin, money-brokers made them a source of speculation, and placed them at a heavy discount. When the mistake and its consequences were brought to the attention of Congress, the legal-tender clause of the bill was repealed, and afterward the coinage was suspended. Its full value here, then, is simply what it is worth as so much bullion, which fluctuates from day to day, but does not vary a great deal from 50 cents. An effort was made some time ago by bankers and other money speculators to get the Government to redeem this trade dollar with gold at par. The effort failed, and there is now a bill before Congress, and which may pass, authorizing the Treasurer to redesign them with standard dollars at par. The Government cannot lose much, if anything, on this proposition, as the trade dollar actually contains more pure silver than the standard dollar contains. In the intrinsic value they stand relatively thus: The trade dollar weighs 420 grains, 900 fine, and contains 378 grains of pure silver. The standard dollar weighs 412½ grains, 900 fine, and contains 371½ grains of pure silver. The Government will only be at the expense of recoining, which will be almost if not quite compensated by the difference in intrinsic value—about 7½ grains of pure silver in favor of the trade dollar. The trade dollar not being lawful money of the United States is not current, consequently is not used in traffic. Banks and money-brokers buy them at their market value as bullion.

[The only objection against the Government redeeming trade dollars in gold is the fact that they are now all in the hands of speculators who have bought them up at prices generally below what they can now be sold for as bullion. Hence the only persons to be benefited are moneyed speculators, who have no claim upon the Government for special legislation. Government is under no obligation, and should not aid speculators in trade dollars any more than it should speculators in any other kind of merchandise.]

WHAT A WONDER BALL IS.—There is a fancy that has been brought over by our German friends from the Fatherland. It is known as a "wonder ball," and is already rolling on its way. It is of German origin, as the motive connected with it will show; for, as a people, the Germans, more than any other, invest the common affairs of life with an atmosphere of sentiment. The wonder ball is a form of gift—many gifts in one. The friends of the one who is to receive it are in amiable cahoots together, and by their united efforts it is produced. An amount of bright wool is bought, say enough for a shoulder shawl, or even for an Afghan. The gifts, which should be of small bulk, are wrapped in paper, with the giver's name, a note or any other personal remembrance affixed, and then the yarn is wound about one until it is covered, when another is added and the same process repeated. This goes on until all the gifts are included in the package, one at a time, each interwoven with its concealing web of threads. Now comes the charm. The receiver is requested to knit from that ball, or to crochet any article she may choose to fix upon, and not by any chance to unwind the yarn only so fast as the work progresses. It is like undoing a long Christmas stocking with presents in it down to the very toes. And see what a stimulus to industry! Curiosity will grow stronger as each gift appears, and the work is pretty certain to be swift and soon completed.

A NEW PATENT BARREL.—Another barrel has been patented, and when manufactured on a large scale and introduced to the trade, promises to become a popular package. It is made of hard and soft wood, each alternate stave being of the soft variety and slightly thicker than the hardwood stave. The edges of the staves are cut square, and when placed together to form the barrel the outside are even and there is a V-shaped crack between each stave from top to bottom. The driving of the hoops forces the edges of the hard staves into the soft ones until the cracks are closed and the extra thickness of the latter makes its inner edges lap over those of the hardwood staves, making the joint doubly secure. This invention has been perfected by Charles Espenschied, of Hastings, Minnesota, and his foreman cooper, and promises to make a revolution in the cooperage business when introduced.

KEROSENE OIL IN WASHING.—Those who have tried it are enthusiastic on the use of kerosene oil in washing clothes, because it does at least four things, viz., it eases time, it saves labor, it saves the goods and it cleanses the clothing more thoroughly than by any other method. Fill a good-sized washboiler with water, adding a pound of ordinary washing soap, shredded fine, and when the soap is dissolved, two and a half tablespoonfuls of the kerosene oil. When the water has come to a boil, put in the finest white goods, turning them over occasionally, and taking them out in 10 minutes;

then place in clear, hot rinsing water, and from that into the bluing water. No rubbing is required ordinarily, and the clothes are soft and of a dazzling whiteness. Should any speck of dirt remain, a slight rubbing with the hands will remove it without the addition of more soap. When the finer goods are taken out of the boiler, coarse goods can be put through the same process, thus flannels (white) and then towels, after which the water is still serviceable to wash colored goods. Should the water be low, add more, and also a half pound of (shredded) soap and another spoonful of oil. That is all there is about it, and if these simple directions are followed the terrors of washday will belong to the past, and hundreds of toil-worn women will take on a new lease of life.

TO CLEAN HAIR BRUSHES.—The best way in which to clean hair brushes is with spirits of ammonia, as its effect is immediate. No rubbing is required, and cold water can be used just as successfully as warm. Take a teaspoonful of ammonia to a quart of water, dip the hair part of the brush without wetting the ivory, and in a moment the grease is removed; then rinse in cold water, shake well and dry in the air but not in the sun. Soda and soap soften the bristles and invariably turn the ivory yellow.

DOWN DRAUGHTS IN CHIMNEYS may be obviated by a recent English device. It consists of a number of grooved rings placed over each other with spaces between and made of metal or clay. The grooves are so shaped that when the wind strikes them it is so deflected that it draws air up the chimney, and in this way effectually prevents down draught.

A SILVER SURFACE FOR IRON.—An ingenious process for giving silver surface to iron has recently been devised in Austria. The iron is first covered with mercury, and silver is deposited upon its surface electrolytically. The iron is then heated to about 300° C., and the mercury evaporates, leaving the layer of silver upon the surface of the iron.

THE circumference of a circle is 3.1416 times its diameter.

GOOD HEALTH.

Healthful Breathing.

Tight lacing and lazy ways of breathing, says Helen C. Swazy, in *St. Nicholas*, prevent the lungs of the adult woman from getting enough exercise for their own good.

It is well to establish the habit of deep breathing, but, in addition to this, the reserve air which is left in the lungs after an ordinary expiration should be expelled, and the lungs thoroughly ventilated at least twice every day. First, then, see to it that the air in the room is as pure and fresh as out-of-door air can make it. Then, with all tight and superfluous clothing removed, lie flat on the back, and, with the mouth firmly closed, take a full deep breath. Hold it 8 or 10 seconds, and then let it out. Take another, and yet another breath, in the same way.

After that, take a breath into the lungs as slowly as possible, beginning to fill them up at the lowest extremities, and inhaling gradually until they are filled to their full capacity, when the air should be exhaled in the same slow and steady manner in which it was taken in.

When you have taken this movement again, to make sure that the shoulders are in good position, throw your arms vertically over your head and take another quick, full inspiration, swinging the arms rapidly to the sides close to the body and back again over the head. Swing the arms up and down four times on the same breath, and repeat the exercise three or four times.

After this it is a good plan to stand erect, with the arms horizontal at the sides, and vigorously clasp the hands from that position over the head a few times. When taking such movements in an erect position, always keep the chin two or three inches back of the vertical.

A few such exercises as these, for 5 or 10 minutes at night and morning, will promote refreshing sleep and give increased vitality.

CURE FOR DIPHTHERIA.—Dr. A. Brondel writes, in the *Bulletin General de Therapeutique* of Nov. 15, 1886, concerning the treatment of diphtheria by benzoate of sodium, and asserts that of 200 consecutive cases he has not lost a single one. He admits the possibility of a mistaken diagnosis in some instances, but, even excluding 50 per cent on this account, he still has 100 cases without a death. His method is as follows: Every hour the patient takes a tablespoonful of a solution of benzoate of sodium, 15 grains to the ounce, and at the same time one-sixth of a grain of sulphide of calcium in syrup or granule. In addition to this the throat is thoroughly sprayed every half hour with a ten per cent solution of benzoate of sodium. This is done religiously at the regular intervals, day and night, but no other local treatment is employed. No attempt is made to dislodge the false membrane, and no penciling nor painting of the fauces is resorted to. Tonics are given and antipyretics are used when occasion calls for them. The nourishment consists of beef juice, tender rare meat, milk, etc.; but bread and all other articles which may cause irritation of the throat are

forbidden. The sickroom is kept filled with steam from a vessel containing carbolic acid, turpentine, and oil of eucalyptus in water.

The employment of benzoate of sodium is not a new method in the treatment of diphtheria, for it has been tried and is recommended highly by Letzerich, Kien, Ferrosol, and others. But this, of course, speaks so much the more strongly in favor of the remedy; and as Dr. Brondel's results were better than those obtained by others using the same drug, it is to be presumed that his method of employing it is the best.—*Medical Record*.

To Cure a Felon.

The *Boston Transcript* says: That woollen smoke is a cure for a felon is certainly one of the medical discoveries of the age. Could we give the name of the correspondent who sends us the following, it would be at once recognized as of authority sufficient to guarantee the truthfulness of any assertion to which it might be appended:

"If you ever endured the agony of a felon, you will appreciate the fact that it can be cured by woollen smoke. Place the woollen rags under an inverted flower-pot, and put coals upon them, or set them on fire some other way, then hold the felon over the smoke, and it will extract all the pain. This has been done by a friend of mine within a week. I assure you that in my circle we consider it as great a discovery as that ether will temporarily deaden pain. The only remedy for a felon that I ever considered infallible, and I have had cognizance of several aggravated cases, was having the part laid open (under the influence of ether) and the bone thoroughly scraped. That reaches the root of the difficulty; but the smoke cure is far better. I once took a woman to a hospital, and charged the attendants to see that the ether was administered previous to the operation; but they broke their promise, and it took two men to hold the poor girl during the operation, after she had suffered untold distress with her finger for three weeks, which distress I had shared."

[Should any of our readers have occasion, and think proper to make use of the above remedy, we should be much pleased to hear of the result, whether it be favorable or unfavorable.]

WRITER'S CRAMP is an affection which, until a very recent date, has been looked upon as in most cases incurable. Fortunately, however, for those who suffer from this disease, means are now known to exist not only for its amelioration, but for its permanent cure. The difficulty is one which is not, as its name implies, confined to writers. It may occur in any individual whose occupation brings into constant play one set of muscles; thus the pianist, the telegrapher and the ballet-dancer may suffer from these cramps or from an inability to perform the acts peculiar to his occupation. The cramps are merely symptoms of a diseased condition, the exact seat of which is a matter of dispute, some locating it in the brain, others in the spinal cord, while there are those who regard the nerves centers as in no wise affected, but trace the source of the affection to the nerves themselves. The method of treatment which has been found most successful consists in the application of gymnastics, combined with massage, to the affected muscles. The rubbing, and sometimes a gentle striking of the muscles with a wooden bar, together with regular movements of the fingers or other defective part, are continued for several weeks, during which time not more than one hour daily is devoted to these exercises. During five years, Wolff, who has given special attention to this affection, has treated 277 patients. Of this number 245 were writers; 32 were pianists, violinists, telegraphers and painters; 157 were cured, 22 improved, and 98 not cured.—*Science*.

THE MUSCLES OF MAID AND MOTHER.—It has been suggested to us that the effect of the athletic exercises now common among girls, if these are really beneficial, should have begun to appear in the physique of women of the present day, and to show itself in greater fitness for the duties of maternity. Medical men in practice might, no doubt, throw some light upon this question. To our mind there seems good reason to believe in the generally beneficial effect of all such means of educating muscular power if they be used in moderation. Besides the intrinsic property of increasing vigor and agility, they necessitate a greater freedom from the rigid restraints of dress which were usual 20 years ago. They imply, moreover, a liberal allowance of fresh air, and, by encouraging vital changes throughout the body, combat that dislike of food which is so common among young girls of listless habits. Thus, in various ways, their tendency is to strengthen and stimulate the whole system. There can, we think, be little doubt that the woman who has grown up under this wholesome training is the fitter in consequence to bear the lot of her sex in married life. Her nerve will be stronger, her muscle power greater and each natural function proportionately more active.—*London Lancet*.

LADY DOCTORS IN THE FIFTEENTH CENTURY.—Dr. Horowitz, of Frankfurt-on-the-Main, has published a work entitled "Jüdische Aerzte in Frankfurt," in which the learned author mentions the interesting fact that as long as 450 years ago, Jewesses practiced medicine in that city; they especially devoted themselves to ophthalmia.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alameda.

OPENING UP THE COAL.—*Livermore Herald*, Feb. 12: A little over a year ago, Jenkins Richards, the well-known miner, who has been connected with the Livermore coal mining district almost since its discovery, began a tunnel to open up the upper and larger coal vein on a level. This work was begun as the result of a contract made with Messrs. Stevens & Wynn to work the vein on their ground on a royalty. Beginning near his old works, Richards ran in 300 feet, when he struck the vein, as he expected. He knew before starting that there was a break in this vein, but supposed it to be somewhere from 20 to 100 feet in width. He therefore turned his tunnel, and followed across the break, guided by the broken chunks and masses of coal. The formation was hard, his effort to form a company proved fruitless, he had very little money, he was offered a good salary to accept a position as a mine foreman in Texas; but notwithstanding all, Richards kept pegging away at the solid rock in his tunnel, with a grim determination, and a "stick-to-itiveness" worthy of hearty commendation. One hundred—two hundred feet—and still not a sign of the vanished coal vein, other than the broken masses of coal scattered here and there by the mighty convulsion of nature which rent this mountain thousands of years ago.

Amador.

PLYMOUTH.—*Dispatch*, Feb. 12: Dr. A. C. Smith, of this place, who has made a small fortune through his practice since he came to this town some ten years ago, has formed himself into a company of one and has commenced operations on a mine situated west of Nashville. He has bought the heavy hoisting works that have lain idle at the old Alpine mine for several years, and had them moved to his mine. Although the recent heavy rains have hindered work to some extent, he is pushing the matter vigorously. The mines belonging to the Plymouth Con. Mining Co. are in excellent paying condition, as evidenced by the facts that the 80 stamps of the Empire are constantly kept in motion grinding out the valuable metal, and that the Pacific mill is being enlarged by 40 more stamps. This work is being rapidly pushed by an excellent millwright from the Bay city. A pit had to be dug in solid slate rock large enough to admit the entire new mill. A large force of men and several teams were employed some four weeks in digging it, it being some ten feet deep in the rear end, into which the millwright fell some time ago and was carried to the hotel in a serious condition, from which he has barely recovered. The appearance around this mill reminds one of a young lumber yard. The lumber was obtained from the Tarr mill, and is acknowledged to be the best lot of building lumber that has ever come into Plymouth. Sinking on the New London is being pushed in earnest. They are now down about 700 feet and have an excellent ledge of fine ore. It is said that when they reach a depth of 1000 feet, and the ledge continues good, a large mill will be erected. The Chicago mine is a new mine just opened southwest of the Pacific. Recent developments have proven this to be a first-class mine.

OLETA.—*Cor. Amador Ledger*, Feb. 12: The Marble Co. is talking of cleaning out its ditch, and taking water from Dry creek as of old. Mr. McAdams, the superintendent, is putting the mill in good order for sawing. There is scarcely any mining being done around here this winter, owing to a scarcity of water.

PINE GROVE.—Mining is at a standstill around Pine Grove, except with James & Son, who are prospecting their quartz mine.

SUTTER CREEK.—Work at the Wildman mine has been materially retarded by the storm. The hoisting works, however, are almost completed, and the building over the shaft has been commenced. The Lincoln mine came to a standstill this week, to remain idle for some time. The water being available for the Mahoney mill, the entire 40 stamps were started, and will be kept in motion steadily. Three or four men have been put to work on the North Star claim, between here and Amador, just south of the Talisman. This mine was bonded recently to San Francisco parties for \$27,000. E. C. Voorheis has also bonded his claim between here and Amador City, and work thereon is to be commenced soon.

Calaveras.

WEST POINT.—*Calaveras Chronicle*, Feb. 12: The Keltz mine is turning out the usual amount of first-class ore. The richest ore exists in the bottom levels. The ledge is from two to three feet in width, being a solid compact mass of mineral, and ranging from \$200 to \$1000 per ton. Ore is being continually shipped to Selby's Reduction Works.

THE SCORPION MINE is extracting ore at a lively rate, supplying the mill to its utmost capacity, which is a Tustin Wet Pulverizer. Concentrations are also shipped to Selby's.

THE STAR OF THE WEST is turning out sufficient ore to keep the mill in full blast. The ore is being taken from the upper levels.

THE LOCKWOOD MINE is in full operation. Size of ledge in shafts, levels and stopes is from three to six feet wide. The ore yields \$130 per ton. The mill is taxed to its fullest capacity. This mine, like the Keltz, is paying large dividends.

INDIAN CREEK.—*San Andreas Prospect*, Feb. 4: John Salsure and George Hengen are prospecting a claim known as the Christmas Gift, one-third mile east of the Esmeralda mine. A shaft has been sunk 30 feet and they have a ledge two and one-half feet wide on the bottom. The gentlemen have traced the vein for several hundred feet on the surface and have found good prospects. The quartz carries sulphurets containing a large quantity of galena. Messrs. Demorest and Moore are prospecting on the west extension of the Esmeralda mine. It is their intention, so we are informed, to erect a 10-stamp mill in the spring. They have quartz that will justify them in making extensive improvements. Adjoining the Demorest and Moore mine on the west is the Narragansett claim, owned and worked by W. H. Mathewson and Dave R.

Oliver. Mr. O. has recently leased the Bonanza mine in Sonora. The Narragansett mine has been prospected for years, and is thought to be one of the best mines in that vicinity. Messrs. Oliver and Mathewson have located a mill-site and water right, and intend to open up their claim in the spring. The Cunliffe mine is being worked by a company, the name of which we failed to learn. The main shaft is 100 feet deep on the lead and drifts have been run each way on the vein at the 100-foot level. A five-stamp mill is kept running steadily on good milling rock. William Crews and Cyrus Davis are working the old Mt. Vesuvius claim on the ridge between Indian creek and San Antonio creek. The rock from this mine prospects well. Considerable work is being done on the Bosco mine, owned by J. B. Reddick, F. J. Solinsky and Cunio and Dasso. The Cunio Bros. are working the mine and they have taken out some fine-looking rock lately. Frank Silva and others are prospecting on a lead near the Bosco mine. They have taken out some very rich rock this last week.

MURPHYS.—*Cor. Mountain Echo*, Feb. 12: Mining is looking up on all sides of us; a deep interest is being taken in prospecting, resurrecting old mines, and increased activity in those which are now being worked. In the Indian Creek district, prospecting is being vigorously prosecuted, and many locations have been made, some of which bid fair to prove good. The Oro Plata is running on full time, with a full complement of men. It is said that the Burleigh has disclosed a rich body of ore on the 100-foot level. Two Burleigh drills are used in this level, one in crosscutting and one stoping. The 15-stamp mill and all of the pulverizers are in motion day and night. So far, the storms have not interfered with the extraction of ore in the large pit, and henceforth many of the obstacles that retarded work from the storms last winter will be obviated this winter. The Cunliffe & Driver mine, on Indian creek, is worked economically and successfully; their 5-stamp mill is run only about 12 hours in 24, on account of the scarcity of water. A \$1600 cleanup was made recently on a short run, and rock of the same rich character is being extracted for reduction. The mine is sure to prove remunerative. The Esmeralda, also on Indian creek, is keeping up its reputation as a gold-producing mine; the first run of two weeks of the new 10-stamp mill yielded \$2300 in bullion. The mine is looking well, and will doubtless richly reward the lucky owners. To the south of us, in the Williams range, two miles from here, excellent prospects are found, and the Silver Reef mine, hitherto worked by Geo. Taylor, now bonded to expert Tulloch, looks well enough to erect a mill on it, and they have this project in contemplation. The gravel mine of McCormack & Co., on Central Hill, is worked with Mc's usual energy and ability, and the next cleanup will be a big one. These gentlemen have expended considerable money in fitting up their claim, and are deserving of the success they are sure to meet with.

STAMPS RUNNING.—*Calaveras Prospect*, Feb. 11: The Union mining management believe, not in "making hay while the sun shines," but in making a large return of gold while the water lasts. Are running 30 stamps on full time, and we look for big returns next cleanup.

BANNER MILL.—In a few days the work of making a number of needed improvements will be commenced on Banner Mill, such as putting in new underpinning, etc.

El Dorado.

IDLE.—*Placerville Observer*, Feb. 15: Most of our mines are idle, owing to the fact that there has been no water in our large canals. We understand a large amount of snow has fallen on the mountains during our late storm which will insure water for all when it is turned on.

NASHVILLE.—Nashville is located on the Cosumnes river in the southeastern part of the county. Nashville enjoys the distinction of being the oldest quartz-mining camp on the Pacific Coast, and in the palmy days of long ago she rejoiced in the name of Quartzville. It is here the first stamp mill in this State was erected, in 1850. The machinery was made in Cincinnati and shipped around the Horn in '49 for the old Tennessee mine, now known as the Nashville mine. The stamps were of oak, 10 inches in diameter, and shod with iron. Near the site of this ponderous affair stands a fine 20-stamp mill, erected by Joshua Hendy a few years ago, and which is now idle, the result of mismanagement and litigation. When litigation, which has been the bane of this mine, is at an end, it will once more take its place among the dividend-paying mines of the State. It has been developed to the depth of 600 feet, the greatest depth attained in this district. The vein is large and well defined between slate walls, and pays from \$7 to \$10 per ton. Adjoining the Nashville mine on the north is the Cumberland, once known as the Montezuma mine. It was discovered and worked in the early days by Mexicans. A few years ago Hart and Griffith got hold of the mine, and, erecting a 10-stamp mill, crushed a lot of old dump thrown aside as worthless in former years, realizing a handsome profit therefrom. Lacking the means to put up suitable machinery and open up the old shaft, when they had exhausted the old dump and all the quartz obtainable, they, with their limited means, had to abandon, and nothing but assessment work has been done since. The shaft on this mine is 240 feet deep with drifts north and south on the vein, which is a true fissure averaging about three feet in width of high-grade ore. Other openings develop a separate and compact ledge of lower grade ore.

Fresno.

HILDRETH MINES.—*Fine Gold Miner*, Feb. 12: In the Texas Flat mine, owned by Haggins, Hearst and J. M. Wilson, a very important discovery has been made. It seems that a gopher, while digging deeper into the earth, brought to the surface some loose quartz containing gold, which exposed to view wire gold. From this hint the company started to open up the ground, and had not gone far before a fine two-foot quartz ledge was discovered. The company has started to sink a working shaft upon the find. McNally & Co. have opened up a good body of ore in the White Rock mine in Fine Gold District. Heretofore they have been sinking a working shaft, and only lately commenced drifting to the ledge. They happened to hit the pay chute a few days ago. The Buckeye mine, owned by Overton & Keller, is the extension of the Rough and Ready mine, and the face of the tunnel which they are drifting looks unusually well. From wall to wall

the ledge averages one and one-half feet in ore that mills \$28 per ton in coarse gold, and the sulphurets in this prospect are very high grade, assaying back from the face of the tunnel 38 feet, on an average of \$500 per ton. The Patterson mine is the extension of the noted Wilson Prospect, and the owner has lately opened up a fine two-foot ledge that returns assay value of \$40 per ton coarse gold. The Wilson mine and ledge is improving as they attain depth in the shaft. The ledge in this property has always given satisfactory results by assay, from the top to the present sump, and is considered by experts to be a fine property. The Promontory mine, owned by James Ryan and others, is a good proposition. The ledge averages one and one-half feet, and will prospect \$25 per ton, while the ledge matter incased between the walls is four feet wide, and also prospects in coarse gold. The Bonanza Queen mine, that was lately sold to Taylor & Frazer, has turned out to be a very good investment. The ledge and ledge matter prospects well, is three feet thick, averages two feet, and will mill \$50 per ton.

The Cascade quartz mine is the oldest mine in that section of Fresno mining district, and through its owners, the Baker Bros., has been the cause of the late discovery of the Bonanza Queen, Promontory and Rough and Ready mine. The Cascade ledge owners, who comprise at present the Baker Bros. and F. C. Scully, of San Francisco, are drifting in on the ledge, which is in 75 feet. The ledge at the face is 1½ feet, with clay selvages on each wall, being incased with porphyry as country rock. The tunnel will top the ledge below the sump of the working shaft 125 feet. The ledge will mill \$35 easily in coarse gold, and the sulphurets will average \$300 per ton. The French Co. has decided at last to start up the Quartz Mountain mine by sinking the shaft (which is on a 10-foot ledge) 200 feet deeper, in hopes that the ledge will come in on higher-grade ore. At present the ore and 10-foot of a ledge only average \$12 per ton. The same size ledge in any other formation and location would be a big thing, and if the ledge opens up at 200 feet deeper \$25 rock, the company will have use for their 60-stamp mill. The Dahlonoga mine is the south extension of the Blue Streak mine, that was lately bought by Haggins & Co. The Dahlonoga property is, in fact, as good a mining proposition as the Blue Streak, having a five-foot ledge from wall to wall; and, to use the expression of John O. Earl and other experts, it is as good as the Haggins property. The present depth of the working shaft is 45 feet, on a ledge that will mill from \$35 to \$40 per ton of good-milling quartz. Superintendent Wallis, of the Hildreth mine, is having the water lowered at a fast rate, and inside of five days the mine will be pumped dry. Miners will be put to work sinking and drifting to an advantage. All the levels contain ore that has milled from \$45 to \$65 per ton, and some very rich nuggets have been brought to the surface during the life and management of the late Thomas Hildreth. The George mine is considered one of the best prospects in the section for the amount of development done. The ledge is incased in walls of granite, averages in size about 1½ feet, assays \$25 per ton, and has a dip of 45 degrees. Last week Frank Hammack and A. Brant worked 16 tons of their ore and obtained \$400. The late discovery in the Ahby mine is the opening up of a new body of ore, separated from the gold-bearing ledge, that assays \$420 per ton in silver. The Fine Tree mine is at a depth of 800 feet in their incline, upon a 3½-foot ledge, that mills \$60 per ton. The ledge dips 45 degrees, and its hearing is north 20 degrees east.

Mariposa.

BUENA VISTA.—*Mariposa Gazette*, Feb. 12: Mr. Emanuel San Pedro just returned from the metropolis, where he has been a few days purchasing an outfit of machinery for the Buena Vista mine. He is a live mining man, whose keenness and practical sense can penetrate a mine far ahead of the drill and pick, and who will in due time be able to answer the problem whether the gold-bearing quartz of Mariposa county, or of Saxtons' creek, go down into the bowels of the earth or not. Mr. Pedro is an enthusiastic and industrious miner, and we feel assured that another 30 years will not be allowed to pass before some legitimate prospecting and work is done in our mines and some paying developments made that will be satisfactory.

Mono.

MONOVILLE.—*Bodie Miner*, Feb. 12: The ore chimney recently struck in the north drift, 150-foot level of the Rattlesnake mine, has been cut through to the distance of 10 feet, the vein being 20 inches wide, all of ore that assays up into the thousands of dollars. The south drift on the same level is in over 100 feet and in very good milling ore. Everything about the mine is in good working order and the arastras will be started up within a week or 10 days. The incline shaft on the Corinthian mine is now down 93 feet and the ledge looks more compact than at any time heretofore. The quality of the ore has also considerably improved. The owners of the Blackstone mine intend to soon commence sinking on the ledge; then look out for rich developments.

Nevada.

WASHINGTON DISTRICT.—*Nevada Transcript*, Feb. 15: Two and a half years ago the *Transcript*, after careful examination and inquiry, asserted that the Washington mining district would eventually prove one of the best in the county, and the equal of any in the State. The district is to-day fulfilling all this paper's prophecies and the writer candidly believes the near future will astonish even the most enthusiastic now. All the indications point to a very successful year in that section. Prospecting for new ledges is being carried on in every direction. Men can be seen scouring the mountain-sides and peering into the gulches and canyons in every direction from Washington, and frequent finds of promising ledges are reported occasionally; but particulars are not given as we would like to have them. Those familiar with the district are firm in the faith that at least four, if not more, new mines will be opened this season. Near Alpha, Messrs. Shattuck & Stoddard are meeting with great encouragement in opening a bonded mine, which, in many respects, is similar to the Spanish mine. They have a mammoth formation of soft material mixed with quartz, which all prospects well, and good judges think they have a good mine. They will probably put up reduction works of some kind this summer. The Washington Mining Co.'s property near the mouth of Canyon creek is being developed as fast as possible, and is daily improving as work progresses.

The main tunnel is now in 240 feet all the way in a ledge that will average three feet in width. A few days ago the ledge made a splice, and opened out to four feet wide since then. Some fine ore, full of free gold and galena, has been extracted. From a point 125 feet in from the mouth of the tunnel, a winze has been put through to the surface. All the way up on this raise the ledge has not been less than seven feet wide between two very regular and well-defined walls. Sinking will now be commenced in the bottom of the main tunnel immediately under the raise, and as much ore as possible opened up during the winter. As soon as the weather will permit, a suitable mill will be erected, and another dividend-paying mine added to the Washington mining district. The Blue Jay ledge is one of great promise. The pay chute, as far as opened, is nearly 100 feet long, the ledge averaging three and a half feet in width. Good judges place the value of the rock at \$15 to the ton. The owners expect to put in hoisting works and a mill this season. The Chief mine, being prospected by Watson & Co., is developing well. It is located on Canyon creek, about four miles above its junction with the Yuha river. The rock is as high grade, so far, as any found in the district, and present indications point to a large body of ore. Hoisting works will be erected before June. Near by this ledge there are two other very promising properties that will be developed partially the coming summer. The old Baltic, Gambrinus and Crown Point claims, now under the energetic management of E. W. Roberts, and owned by Oakland parties, are looking finely. Ten stamps have been added to the mill, and important development work has been pushed all the fall, and so far this winter, with promise of showing good results. These properties are just north of Canyon creek, in what is known as "God's Country." The company will employ a large number of men the coming season. The Blue Bell mine, just north of the Eagle Bird, has been bonded, and the shaft will be sunk 100 feet deeper. Work will be commenced on this in March, and as the company handling it has the means, and the mine is a promising one, it may be expected that rock will be worked before the ides of November. The old Yuha mine has recently found a 12-foot ledge in the 400-foot level which looks fine. The mill is now running and it is said will be increased in capacity 10 or 20 stamps this season. The company is running a tunnel on one of its other properties called the Jockree, and expects to open up a big mine. They have about 200 feet further to run on the ledge to strike the pay chute. The ledge on the surface mills \$17 to the ton. The Eagle Bird still continues to hold its own, and to demonstrate that it is the best young mine in California. Twenty stamps and a Huntington mill are continuously run on rock taken out while sinking and running levels and winzes, without stopping at all, and the quality of the rock seems to increase in value with depth.

GOLD GETTING.—*Nevada Transcript*, Feb. 12: For the past year or two, Patrick Naughton has been working a ledge located near the South Yuha river, in the vicinity of Lake City. The quartz, according to report, is looking well. Pat has already had two good offers for his ledge, but he has refused both. Jos. Kilroy and others, residing in Cherokee, are working a ledge in Grizzly canyon. The ledge is small, but some good quartz, bearing free gold, has been taken from it. Curnow Bros. have a good mining claim. It is an extension of the Delhi. A large number of ledges on the south bank of the Middle Yuha river are being prospected; some with good results.

FIFTEEN HUNDRED DOLLARS A DAY.—Superintendent Brown, of the South Yuha Company, yesterday informed the reporter that the probabilities were the water would be running again in the Idaho ditch by last night, enabling the mines that depend upon it for their supply to resume work to-day. The breaking and blockading of the ditch as a consequence of the storm is attended by a very heavy loss to the corporations interested, as well as to the men employed in the mines. The South Yuha Company has been paying out wages to the amount of \$150 a day to the gang of men employed in cleaning out the snow, and loss sales amounting to about \$100 a day while the water is shut off. At the Idaho 200 men are thrown out of employment, at the Empire 150, and at the Pittsburg quite a number. If the mines start again to-day they will have been idle just seven days.

CHAPMAN RANCH MINE.—*Transcript*, Feb. 11: The incline at the Chapman Ranch mine just west of town is now down 120 feet, and the water has been pumped out of the old works. The vein at the bottom is from 12 to 18 inches thick with a clay seam on one wall. It is the intention of the management to sink 50 feet further before drifting. The indications are that a good mine will be opened, as the claim is not far from the fissure which runs up Wood's ravine.

Placer.

YIELD OF THE ZANCRAFT.—*Placer Republican*, Feb. 9: The yield of gold from the Zancraft mine for the season has been remarkably good, and shows that it is one of the best quartz mines in this vicinity. Soon after there was enough water to run the ten-stamp mill, the first shipment was made on December 11th, and amounted to \$2576.82, net. The second shipment was made on December 31st, and amounted to \$2908.18. The third was on January 15th, and amounted to \$2242.14, a total of \$7727.14, net. About 12 men work at the mine.

Plumas.

BUNKER HILL CON.—*Plumas National*, Feb. 5: W. Metcalf, the superintendent of the Bunker Hill Consolidated, informs us that he has six men at work at present and will put on a large force as soon as lumber can be got on the ground to put up boarding-houses and other buildings necessary to the working of the mine. The Bunker Hill is prospecting beyond the most sanguine hopes of its owners. Mr. Metcalf has had 35 years' experience in mining, and there will be no Brussels carpets or kid-glove miners about the premises.

San Diego.

JULIAN MINES.—*San Diego Sun*, Feb. 12: Nine tons of ledge croppings from the Desert View mine, of the Julian mining district, reduced at the Stone-mill lately, averaged \$27 a ton. This is considered pretty good for a new find. The existence of the ledge has been suspected for some time past, but, being difficult of access, no attempt was made to

open it until quite recently. McConnaghy & Son's stage line is now running through to the Stonewall mine via Julian, carrying U. S. mail, express, and passengers. Capitalists are quietly looking up mining properties, and it is said are quick to purchase when opportunity offers, even for small investments.

THE GRAND CENTRAL.—Samples of ore from the Grand Central mine, on the Sweetwater river, about 35 miles from San Diego and a mile from Descanso, having been assayed by Mr. McNamara, have been found to yield \$430 of gold to the ton. This mine was formerly worked, but in a very rude way, the ore being crushed with an anastra. It has been abandoned since 1870. It paid then, but its full value has never been appreciated until its recent reopening. Its owners, McNamara & White, will put two shifts at work on the mine next week, and as soon as the shaft is down about 100 feet a plant for crushing will be constructed. The mines about six miles from the Grand Central are showing well, as, in fact, are all the mines in the Julian belt, and experts were never so enthusiastic in their recommendations of the San Diego county mines as now.

San Luis Obispo.

THE OIL WELL.—San Luis Obispo *Tribune*, Feb. 12: A recent visit to the scene of the operations of Messrs. Nichols, Adams and Walker, near Miles Station, in exploring for oil, satisfied us that the gentlemen interested have still firm faith in their project. The works have been entirely reconstructed, and the best possible facilities are employed to carry on deep and rapid boring. The new derrick is 72 feet in height. Power is afforded by a fine 50-horse power engine, and a large two-story building ultimately intended to form part of extensive improvements required for a tourist and health resort is completed. The well is cased to a depth of 900 feet, the present outcome being a flowing well of white sulphur water of very remarkable constituent elements, having a present temperature of 103° F. and a volume of over 4000 barrels per day. Should oil be struck in sufficient quantity, and of this there are strong probabilities, the value of the discovery to the county can hardly be overestimated. A few miles distant is the great deposit of bituminous rock, the reputation of which is already widespread and has become well known to those interested throughout the State in enterprises likely to be affected by the new product. Vigilant prospecting in all parts of the county and the country adjoining has so far failed to develop any deposit of similar character or extent, and the consequent value of this unique discovery has rapidly appreciated. Extensive shipments of the rock are already arranged for and special facilities for handling it on a gigantic scale are to be supplied. The output of these mines is hereafter to constitute a marked feature in the products and exports of the county and will be immensely profitable to the fortunate owners.

Shasta.

FURNACEVILLE.—Shasta *Courier*, Feb. 12: W. A. Albertson, Jake Overmyer, Armstrong, and others, have made mining locations at Furnaceville, and have obtained very rich prospects, and the result makes them feel jubilant. A mill is talked of, and the assays of ore justify the talk. Several fortunes have been taken out of placer diggings near that place; Seaman and Hart made \$17,000 in that locality years ago, and the former went home to Germany, invested his money advantageously, and lives in affluence. We are informed that the parties who have bonded the Tellurium mine, near Middle Creek Station, will commence work on the same in March.

BULLYCHOOP.—Mt. Bullychoop is white with snow, and at this writing it is still falling; yet it seems that nothing stops the progress of the Cumberland mine. The new ro-stamp mill will soon be in running order. Supt. R. G. Hart never stops for anything, but just keeps working progressing in all sorts of weather; working about 25 men at present. We are informed by good authority that during next summer the Potts & Foster tollroad will be connected with the free road at Indian creek; then we can go to Weaverville in a buggy.

COPPER CITY.—Theodore Popejoy was in town last Sunday and Monday, from Copper City. The old camp has a glimmer of renewed life, as new parties have taken hold of several of the mines there with energy. If Sallee can successfully work the Iron Mountain ores, why can he not work by similar process the Copper City ores? He can. No camp in this county has ever been so victimized by "experts" as Copper City, and still we believe she will come out O. K. The mines which start up with a sudden spurt, at times, and then sink out of sight for a time, may well be suspected; but Copper City has produced several millions of bullion, which shows conclusively that the ore there is valuable, and as it is known to exist in great quantities, all that is wanted, or ever has been wanted, is competent and honest men to take hold of the milling process. Years of acquaintance with Copper City and Pittsburg districts has not obliterated our confidence in the final and successful outcome.

Sierra.

FLATTERING PROSPECTS.—Truckee *Republican*, Feb. 12: The editor of this paper recently spent a couple of weeks in that prosperous and growing town to the north of us, viz., Sierra city. There has been a large amount of work done in that vicinity the past season in the way of developing the valuable mines that exist there, and the town itself has improved greatly. Nearly 40 new dwellings and business houses have been erected within the past year. The mines are all paying well. It has been reported that the Young America mine has been bonded to an English company for \$2,200,000. No sale, however, has been made. The Phoenix Co. will probably build a large mill in town as soon as they can get the lumber in the spring. The town is bound to become one of considerable importance, but no one should rush in there just at present, as business is quiet and many idle men are waiting for employment.

Trinity.

EASTMAN GULCH QUARTZ.—*Journal*, Feb. 12: From Mr. James H. Fisher we learn the following items concerning quartz developments at Eastman gulch: Mr. Fisher has run a tunnel on the No. 1 mine for a distance of about 95 feet; the tunnel follows a well-defined ledge that averages two feet in width. There are 50 tons of ore on the dump, all of which prospects fairly well. Arrangements will soon

be made for crushing the rock by arastra, and a better idea will then be had of the value of the property. J. C. Feour and C. Foreade, lessees of the Newman & Bearden mine, have recently struck very rich rock on their ledge. The ledge of Hamilton & Gifford also prospects very well. The purchase of the Venicia mine and the erection of a mill thereon will greatly stimulate quartz interests in that section of the county, and Eastman gulch bids fair to become a flourishing camp.

Tuolumne.

SOULSBYVILLE.—*Cor. Union Democrat*, Feb. 12: The Soulsby & Burns mine on the Tuolumne river still continues to look well. They intend to erect arastras, or a mill, the coming summer. They have considerable ore in sight and all mortars well. Frank Prudhomme is taking out very rich ore from his mine at Arastaville. On Monday of last week a chute of fine ore was struck in the Soulsby mine under the slip. They did considerable work before finding it; it is south of the old works and in new ground, and it is very likely that it will be a big thing. Work is being pushed on the Black Oak mine at Soulsbyville. It is considered a good property and it is to be hoped that the company will meet with much success.

Yuba.

MILL.—Nevada *Transcript*, Feb. 12: Rumor has it that a quartz mill will be erected during the coming spring upon the General Grant ledge, situated upon the Yuba county side of the Middle Yuba river, nearly opposite the Delhi mine. This ledge was located a year or so ago by Simeon Jones, Andrew Jones and William Springer. It is now owned by men residing principally in San Juan and Columbia Hill. By some, this ledge is thought to be an extension of the Alaska ledge at Pike City. The chances are that the General Grant mine will prove to be a good mine, as the ledge is very large and the ore above the average.

NEVADA.

Washoe District.

SAVAGE.—*Enterprise*, Feb. 12: 500 level—East crosscut No. 2 is now advanced 16 feet in the ore. Have drifted 15 feet in this ore, and commenced stoping therein north and south from this crosscut. 600 level—West crosscut No. 6 has been advanced 19 feet, and shows some good ore further west than that heretofore reported in this crosscut. 800 level—From the station of the old Savage shaft we have started a drift west to connect with our south drift from the Bonner shaft on this level. This west drift has been advanced 35 feet, and the south drift from the Bonner shaft has been extended 24 feet. West crosscut No. 3 on this level has been advanced 18 feet. There is considerable water coming in from the face of this crosscut, and the material through which it has passed is quartz, all of it carrying precious metals and showing bunches of good ore. 1640 level—We have temporarily discontinued the east and west crosscuts from the north drift, and have resumed work in the face of the north drift. Are making daily shipments of ore to the Mexican mill.

HALE AND NORCROSS.—1200 level—The north drift has been extended 25 feet, and has reached the south boundary of the Savage mine. At this point we have put in sets to crosscut east and west. East crosscut No. 1 from the north drift on this level has been advanced 26 feet. The main south drift has been extended and timbered 40 feet, and the southeast (No. 1) crosscut therefrom has been advanced 26 feet. We are repairing the station at the 1300 level preliminary to the resumption of work in the incline below this point. 1100 level—Have started to open this level of the vertical shaft.

CROWN POINT.—Are extracting about 80 tons of ore daily. This decrease in the quantity produced is due to a part of the Mexican mill working about 50 tons of Savage ore daily. Nothing new to report of the prospecting work being done on the 300 and 400 levels.

BELCHER.—For some time past the Vivian mill has been engaged in crushing Belcher ore, but now it is working on Overman ore. Are extracting about 100 tons of ore daily, which is being crushed at the Santiago mill.

YELLOW JACKET.—Everything is going along as usual. Extracting 160 tons of ore daily that is coming from the 1300 and 1400 levels. This ore is being crushed at the Brunswick mill.

BEST AND BELCHER.—600 level—West crosscut No. 2 has been extended 38 feet; total length, 192 feet. Porphyry formation. 1500 level—The north drift has been extended 76 feet; total length, 424 feet.

THE QUINN.—Expect to finish timbering the shaft in a day or two down to the water level, when the necessary machinery will be erected to pump out the water and allow the shaft to be sunk to a depth of 300 feet.

ALPHA AND EXCHEQUER.—122 level—The north and south drifts are each in 80 feet. The west drift is in 116 feet. A fine body of quartz carrying some metal is being passed through going north.

OCCIDENTAL.—Lower tunnel—In No. 2 upraise, 90 feet above the main tunnel, the north drift has been extended 24 feet; total length, 40 feet.

GOULD AND CURRY.—From the drain tunnel level a station is being cut out preparatory to sinking, in order to make a connection with upraise extending from the 425 level.

POTOSI.—The south drifts Nos. 1 and 2 on the 250 level have been advanced but little during the week. East drift has been advanced 20 feet.

GLADSTONE.—The tunnel has now reached the distance of 135 feet, the face of which is now in greenstone porphyry—a very favorable formation for mineral to form in this distance.

SILVER STAR.—The work of crosscutting from the north drift continues. The formation being passed through is of a very favorable character.

HAYWOOD.—The winze is now down 110 feet, with the header still in ore. Are shipping about 20 tons of ore daily that works \$25 a ton.

UTAH.—472 level—The north drift has been extended 44 feet; total length, 123 feet. This drift is in porphyry, clay and quartz.

SIERRA NEVADA.—520 level—The south lateral

drift, No. 2, has been advanced 60 feet; total length, 194 feet. Vein formation.

SCORPION.—On the 300 level the east drift is now advanced 39 feet from the shaft. The rock continues hard.

OVERMAN.—Having engaged the Vivian mill, are extracting and shipping about 40 tons of ore daily.

CHOLLAR.—The shaft is now repaired to a depth of 600 feet.

Aurora District.

THE SILVER LINING.—Walker Lake *Bulletin*, Feb. 9: Superintendent Gray has the usual force employed on the Silver Lining, at Aurora. Everything looks well, in fact, the only difference in appearance since last week is a slight improvement. The Silver Lining will be a paying mine in a very short time, and Aurora will again be a lively camp. There is a large body of ore in sight, and bullion production will begin as soon as connection is made between the tunnel and the upper level. The English company, which is so largely interested at Aurora, is making arrangements to again begin operations on a large scale, with a view of developing the extensive property included in the purchase.

Gold Mountain District.

SOUTHERN ESMERALDA.—*Esmeralda News*, Feb. 12: The southern portion of this county, which contains several mining camps and many valuable mining properties, is presenting a prosperous outlook. A. P. Anderson, of Old Camp, in Gold Mountain district, is taking out good ore from his Dusty Bob mine, to be worked in his steam arastras. B. F. Leete's new mill works fine. He shows his faith in the camp by locating and purchasing all the ledges that he can get hold of. On the 1st of January all abandoned claims in the district were relocated, and work is being done on a small scale on several of them. It is understood that the Slate Line mines and mill, Gold Mountain, will resume work some time this month.

Montezuma District.

MINERS AT WORK.—*Esmeralda News*, Feb. 12: Montezuma has her quota of miners employed extracting ore and perfecting arrangements for a long and continuous run of its mill. There is plenty of rich ore in sight.

Palmetto District.

DEVELOPING.—*Esmeralda News*, Feb. 12: Blin & Co.'s works are moving along as usual. At Palmetto the company is working a full complement of miners, and is developing mines of that district. They have considerable good ore on the dumps and more in sight in the mines. There are good prospects for a new mill being built there in the spring.

Pine Grove District.

WILSON AND WHEELER.—*Cor. Esmeralda News*, Feb. 12: The mining outlook is better than it has been since the palmy days of Pine Grove, some 20 years ago. The Wilson and Wheeler mines of that place are both being extensively worked under the contract system. Wilson furnishes mining tools, timbers, powder, etc., mills the ore and gives the contractor one-half. The parties are well pleased with the outlook, which is the best evidence of the output of bullion.

San Antonio District.

SHIPPING ORE.—*Belmont Courier*, Feb. 5: Work goes steadily on in one of the San Antonio mines. The ore is shipped to Reno for reduction.

Union District.

MILL.—*Belmont Courier*, Feb. 5: It is expected that the Knickerbocker mill, Union Mining District, will soon be ready to drop stamps on ore from the mines of the new Cincinnati Company.

ARIZONA.

GOLD AND SILVER.—*Prescott Courier*, Feb. 11: Robert Connell tells us that he knows of between 300 and 400 tons of very rich gold and silver ore that will be brought in here for sampling just as soon as the works are erected; and, having been assured that the machinery is purchased, it is pleasant to know that miners, who have had the faith to pick and blast out ore, will soon be able to realize on the same. Such miners are in Groom, Hassayampa, Turkey and some other districts adjoining Prescott. Of course none save very rich ore can be handled in this way, which fact causes all our people to hope general reduction works will, ere long, be put up and run at some convenient point in the mountains. Mr. Jones, who has interests in Groom Creek district, is now at the East, working with this end in view, and will, it is said, succeed. If so, this splendid mining region will be sure to render good and rich accounts. The latest shipment we have heard of was from the Happy Jack mine, which is not far from Prescott. The ore is carbonate. It ought to pay from \$80 to \$100 a ton. An Eastern gentleman of good reputation was recently here gaining information concerning certain mines. He left a few days ago, satisfied of his ability to form a strong company to work three or four of our largest mines. In scanning exchanges from Cochise, Yuma, Pima, Graham, Gila, Pinal and the other mining counties of the Territory, we have run across facts which go to prove that paying mining is being done in all of them, and that the depression is almost at an end.

IDaho.

THE DONOVAN COMPANY.—*Wood River Times*, Feb. 9: Ole Rorem, who returned last Saturday from the East, made arrangements while away to have a mill manufactured; but he has not yet decided whether it will be a steam or water-power mill. He knows that there is no water for power purposes on the Gold Belt, and that the supply for the stamps, pans, boilers, etc., is very limited. He therefore would prefer to locate his mill somewhere on Wood River. But here comes the hitch, as he fears it will cost a couple of dollars a ton to haul the ore to Wood River—and that itself would be no mean profit when 50 or more tons are to be reduced daily. Before he decides upon the location of his mill, Mr. Rorem will therefore endeavor to satisfy himself as to two points. The first will be: Will the proposed Gold Belt railway be built? And the second this: Will the new water-power company be able to supply a cheap motive-power at an early date?

GOLD BELT MILLS.—The experience of the Camas No. 2 Co., dearly as it has been paid for, should lead Gold Belt mine-owners to be more cautious in future, when about to build mills, to place them where a steady supply of water can be had. Such a supply cannot be obtained anywhere as conveniently and cheaply as on Wood River. This stream carries sufficient water, the year round, to operate 10,000 stamps; and from no other source within 20 miles of the Gold Belt can a reliable all-year supply sufficient to run a 20-stamp mill be obtained. Parties contemplating the erection of mills to reduce Gold Belt ores should therefore, at the very outset, secure a water-supply from Wood River; and such supply can be obtained more cheaply at or near Hailey than elsewhere.

MONTANA.

GRANITE.—*Phillipsburg Mail*, Feb. 12: The Granite mill is running steadily on the usual quantity of ores. The new mill will be in successful operation by the 10th inst. The two combined will turn out an immense amount of silver bullion, probably sufficient to pay double the sum in dividends formerly devoted to that purpose. As General Manager Plummer has wisely provided for all of the supplies necessary to carry that extensive plant over the winter, a long and successful run may be safely predicted.

THE PLYMOUTH.—A Colfax correspondent of the *Dillon Tribune* says: Since its discovery, there have been about 130 tons worked, by mill and arastra, from the Plymouth Rock, which average about \$20 per ton. Parties are engaged now in extracting the precious metal from some of the richest rock of this mine, by means of a hand mortar and a pan, and the results are very satisfactory, they having gotten out of 600 pounds of quartz, 3 ounces, 7 pennyweights from the dust and 3 ounces, 5 pennyweights out of reort. Unfortunately for the owners of this mine, these rich spots are so far apart that after one is dug out they get discouraged before another is found, although as a general thing they have had a pretty good vein of second-class ore all the time.

NEW MEXICO.

MIDNIGHT.—*Black Range*, Feb. 12: Mr. R. H. Horner, superintendent of the Midnight Mining Co., of St. Louis, arrived in Chloride last Wednesday. Mr. Horner has come to superintend the development of that valuable property, the Midnight, and will immediately let a contract to drive the tunnel 150 feet further. The Midnight mine is one of the best properties in the range and will undoubtedly prove a valuable purchase for the company. For a long time the people of Chloride have been anxiously awaiting for the time to come when work on this property would be commenced in real earnest, they feeling that the Midnight will develop into one of the largest producers in the county, and the arrival of Superintendent Horner is gladly heralded. Mr. Horner is not only a mining expert, but is a practical miner of round experience. The *Range* learns it is reported on the outside that the ore in the Silver Monument has pinched out. If such a report is circulating, it is a false saying. The Silver Monument is producing ore both in quantity and quality the same as ever, and work of sinking the main shaft 150 feet deeper is in progress, which is good evidence that the mine has not petered out.

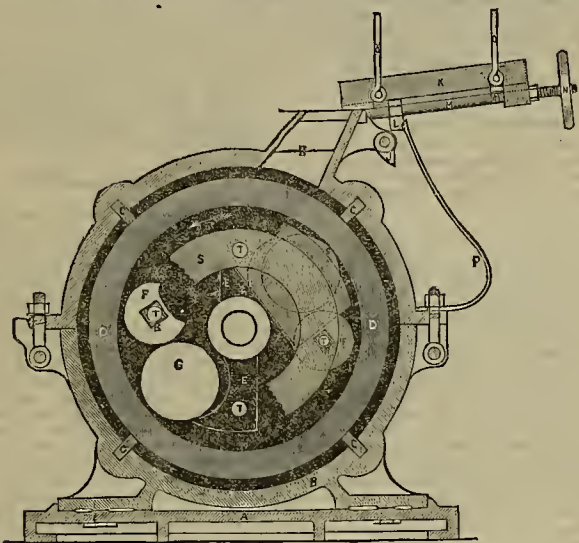
LEASES AT LAKE VALLEY.—*Rio Grande Republican*, Feb. 9: At Lake Valley some 15 leases running for three months, and covering 50 square feet each, have been given out from time to time during the last few months, which are now beginning to expire, one by one. The lessees are shipping large quantities of ore. The company maintains its own counsel as to future operations, and it is not known in the camp whether the system of leases will continue or the company will resume operations on its own account. The Balbach mine, Pinos Altos, is sinking a 200-foot shaft. The shaft is down over 90 feet, and the ore vein is within four feet of the shaft. No drifting will be done until the shaft is completed. The North Homestead mine, White Oaks, that has been in litigation for some time, has fallen into the hands of Dr. W. G. Hunter by the purchase of the Winters' heirs interest, and the parties litigant parting with their interest. The mine is to be operated at once. The Carlisle, Homestead and Columbia mines, Grant county, owned by the Carlisle Mining Co., will add 20 stamps to their 20-stamp mill. The mill books show for four months ending September, 1886, \$38,763.49 bullion and \$16,780.18 concentrates, a total of \$55,543.67, the net profit being \$18,724.37.

UTAH.

REVIEW.—*Salt Lake Tribune*, Feb. 12: The receipts of the metals in this city for the week ending February 9th, inclusive, were \$65,254.82 in bullion, and \$13,295.71 in ore, a total of \$78,550.53—very light all around. For the previous week the receipts were \$287,709.86 in aggregate, of which \$137,554 was bullion, and \$150,155.86 was ore. The output of the Ontario for January was 104,446.49 ounces of fine bullion, and \$60,740.99 from ore sales, a total of \$165,187.48. For the week just past, the Ontario shipped 20,278.54 ounces of fine bullion; no ore sales reported. All goes well with the first monthly dividend of \$75,000 this year, paid, and regular plums of the same size to follow on the 25th of every month. The Daly product for January was 59,624.19 ounces fine bullion, and \$17,518.61 from ore sales, a total of \$77,142.80. For the past week the Daly shipped eight bars of bullion, 11,109.84 fine ounces; no sales of ore. During the week the stockholders were made glad by the announcement of a 50-cent dividend, No. 1, payable in this city February 15th, being \$75,000. Whether regular monthly dividends like those of the Ontario are to follow, has not been fully determined by the management. There was received in this city during the week, gold bars, \$7924.25; fine bars, \$5434.49; base bullion, \$1800. The Hanauer smelter produced for the week, \$20,320, in bullion; the Germania, \$21,076.08. The Stormont sent up on the 5th, silver bars to the value of \$3900. The Bannock sent down from Idaho on the 7th, silver bullion of the value of \$4200. Ore receipts in the city for the week were \$2400 by Wells, Fargo & Co., and \$10,895.71 by T. R. Jones & Co.



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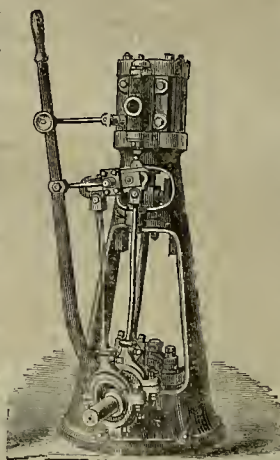
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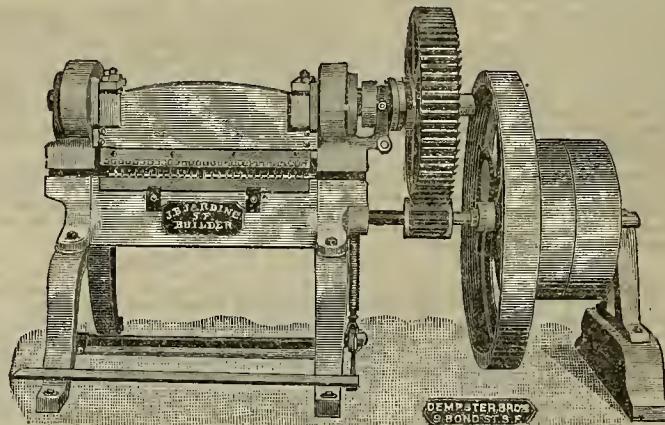
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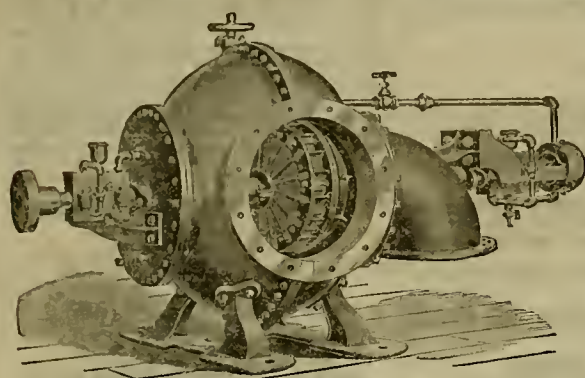
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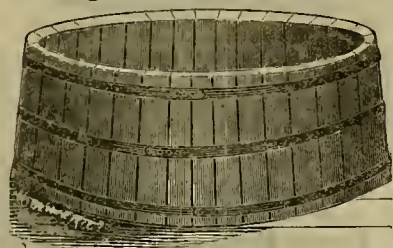
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Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MUSIC-LEAF TURNER.—Patrick L. Carden, Dixon, Solano Co. No. 356,983. Dated Feb. 1, 1887. This invention consists in the novel arrangement and construction of the leaf-holding arms, the operating key, the power-transmitting mechanism between the key and the leaf-holding arms, by which they are successively actuated, the adjustable frame for attaching the device to the rack of the piano, and for holding music of various lengths.

DUMB-WAITER STOPS.—John J. Mahoney, S. F. No. 356,948. Dated Feb. 1, 1887. This is a piece of mechanism for dumb waiters, by which they are stopped at any desired point in their course of travel. The invention consists in the combination and arrangement of the pivoted spring-actuated catch, the rack or notched cam-strip with which it engages, the pivoted spring-actuated trip-lever by which said trip is controlled, and certain details of construction. The object is to provide simple and effective means for positively stopping the waiter at points at which it is intended to rest, and, by the employment of these means, to so nicely balance the elevator as to avoid the usual and wholly unnecessary friction by which the ordinary dumb waiters are checked at points desired.

New York Metal Market.

Telegraphic advices dated Feb. 17th gave the following New York prices:

BAR SILVER—\$1.01 1/2 per oz.
BORAX—5 1/2 @ 6 1/4.
COPPER-LAKE—\$10.40 @ \$11.
IRON—No. 1, \$22.00 @ \$22.50.
LEAD—\$4.37 1/2.

QUICKSILVER—\$4 @ \$5.
The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Dull, spot closing at 11.00. Transferable Notices (Lake) issued at 11.00. Transferable Notices (Chili Bars) issued at 13.50.
LEAD—Quiet at \$4.35 @ \$4.40 spot. Transferable Notices issued at \$4.42 1/2.

TIN—Dull at \$22.50 @ \$22.75. Transferable Notices issued at \$22.60.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.65 @ \$22.80; Billiton Tin, \$23.10 @ \$23.40; Banca Tin, \$23.15 @ \$23.50; Baltimore Copper, \$10.35 @ \$10.50; Orford Copper, \$10.35 @ \$10.50; P. S. C. Copper, \$10.35 @ \$10.50; Foreign Lead, \$4.75 @ \$4.85; Foreign Spelter, \$4.75 @ \$4.85.

MAKER'S PRICES.—At tidewater, 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$21.50 @ \$22.50; No. 2, \$20.00 @ \$21.00; Grey Forge, \$17.50 @ \$19.00. Hudson River, Grade No. 1, \$22.00 @ \$22.50; No. 2, \$20.00 @ \$21.00; Grey Forge, \$16.00 @ \$16.25. Southern, Grade No. 1, \$19.50 @ \$20.50; No. 2, \$18.00 @ \$18.50; Grey Forge, \$17.00 @ \$17.50.

Mining Share Market.

The stock market has been somewhat stronger during the latter part of the week. Fresh orders are said to have been received on account of a strike of good ore on the line between the Savage and Hale & Norcross mines on the 1300 level. The advices also state that the north drift on the 1435 level of California has crossed the Ophir line, following the ore vein, and shows a length of 20 feet of good ore in Ophir ground. The presence of Mr. John W. Mackay at the Comstock mines has encouraged many to invest in the mines under his supervision.

It is stated that the bullion shipments from the Locomotive mine of Quijota, Arizona, amounted to about \$19,000 during last month. Mr. Murray, the superintendent, is now on his way up here with a statement of expenses at the mine, and as soon as he arrives a balance will be struck off and published.

Charles E. Elliot, secretary of Chollar, Potosi, Eschweiler and other prominent mines, will be appointed secretary of the Alpha Consolidated, to succeed Mr. William Willis, deceased.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Locomotive (Quijota, Arizona), for January, \$19,000; Chicago, Feb. 7, \$3832; Alice, \$19,184; Bluebird, \$19,752; Marget Ann, \$3,732; Hanauer, \$9,249; Germania, \$5,613; Moulton, \$9,112; Hanauer, \$10,320; Candelaria, \$9,110; Garfield District, \$11,000; Gold Hill, \$17,000; Hanauer, \$1,528.00; Bannock, \$7,420; Stormont, \$7,390; Germania, \$8,501.3; Last week Wells, Fargo & Co. shipped from Salt Lake, in bullion, \$17,558; McCormick & Co., \$28,430; T. J. Jones & Co., \$32,571; a total of \$78,550.

THE NEW EMPIRE.—A neatly printed work entitled "The New Empire and her Representative Men," has been issued by Wilson Hamilton, of this city. It treats of the Pacific Coast, but mainly of California, giving a very good account of the character of the country for health, wealth, natural resources, climate, and scenery, and pointing out clearly and concisely the advantages and inducements offered to those seeking homes and fortunes on this coast. The work is illustrated. The whole matter is concisely arranged. The description of the State by counties is very well done, and gives the stranger a good idea of the whole country. The book contains some 180 pages and was published by the Pacific Press.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 27.	WEEK ENDING Feb. 3.	WEEK ENDING Feb. 10.	WEEK ENDING Feb. 17.
Alpha.....	2.25	3.60	1.90	2.25
Alta.....	2.20	2.90	1.25	2.00
Andes.....	1.25	1.70	.60	1.15
Argenta.....	.15	.20		
Belcher.....	.50	4.50	2.50	3.00
Brophy.....	.75	.85	.50	.70
Best & Belcher.....	.11	12.80	.11	.91
Bullion.....	2.50	3.30	1.65	2.50
Baltimore.....	1.00	1.10	.50	.30
Belle Isle.....	.35	.30	1.00	1.80
Bodie Con.....	1.35	3.00	1.80	2.00
Benton.....	.75	.85	.30	.45
Bodie Tunnel.....	1.50	1.35	1.60	1.10
Bulwer.....	2.25	2.50	2.00	1.93
Con Va & Cal.....	2.25	2.50	2.00	1.93
Challenge.....	2.00	2.40	1.30	1.80
Champion.....	.975	1.10	1.25	.75
Chollar.....	.975	1.10	1.25	.75
Confidence.....	.90	1.00	1.50	1.00
Con Imperial.....	1.00	1.50	1.00	1.50
Caledonia.....	.65	.70	.30	.40
Con Pacific.....	.30	.35	.30	.25
Crown Point.....	6.25	6.00	5.25	3.75
Crocker.....	1.00	1.25	1.50	1.30
Central.....	.50	.70	.50	.40
Dudley.....	.25	.25	.25	.25
East B. & B.....	1.70	1.50	1.70	1.00
Eureka Con.....	6.00	7.00	5.25	3.75
Eschweiler.....	1.00	1.25	1.50	1.30
Grand Prize.....	1.60	2.50	1.15	1.80
Gould & Curry.....	6.25	7.12	6.25	4.55
Hale & Norcross.....	.75	.95	5.00	8.50
Holmes.....			2.50	2.50
Independence.....	1.00	1.40	1.00	1.25
Iowa.....	.60	.85	.45	.60
Julia.....	1.50	1.95	.90	1.30
Justice.....	.25	.25	.25	.25
Kentucky.....	.40	.55	.25	.25
Little Wash.....	.40	.55	.25	.25
Martin White.....	2.70	3.10	2.50	2.60
Mono.....	.63	7.75	5.00	7.25
Mexican.....	.63	3.50	3.50	3.75
Mt. Diablo.....	.65	.45	.55	1.05
Northern Belle.....	.30	3.50	3.10	3.50
Nevada.....	.45	.50	.50	.50
Nev. Queen.....	.80	.90	.90	.90
North G. & O.....	.40	4.50	3.00	2.60
Occidental.....	1.21	1.60	.25	1.37
Ophir.....	1.30	2.00	.75	1.15
Potosi.....	.85	9.00	.00	.91
Peterson.....	.70	.90	.60	.65
Perrin.....	.50	.70	.40	.65
P. Sheridan.....	.15	.35	.15	.15
Silver Star.....	7.50	8.50	.75	8.00
Savage.....	6.00	6.75	5.00	5.75
Seg. Belcher.....	.35	.50	.20	.35
Sierra Nevada.....	.35	.50	.20	.35
Silver Hill.....	.75	.75	.75	.75
Scorpion.....	1.25	1.50	1.00	1.10
Syndicate.....	.50	.50	.50	.50
Union Con.....	5.25	6.00	3.50	4.00
Utah.....	6.50	7.25	5.50	6.00
Yellow Jacket.....	.65	7.75	5.00	4.25

Sales at San Francisco Stock Exchange.

THURSDAY Feb. 17, 1887.	200	100	50	25	10	5	2	1
400 Alta.....	1.35	1.40	1.00	1.00	1.00	1.00	1.00	1.00
100 Andes.....	.90	.90	.90	.90	.90	.90	.90	.90
350 Alpha.....	.10	.10	.10	.10	.10	.10	.10	.10
300 B. & B.....	.10	.10	.10	.10	.10	.10	.10	.10
550 Bullion.....	2.30	500	Mt. Cory.....	.71				
250 Bodie Con.....	2.00	1300	N. Belle Is.....	.44	.04	.71		
500 Belcher.....	5.40	800	N. J. W.....	1.60	.61	.65		
500 Baltimore.....	1.00	50	Nevada.....	2.05	.6	.6		
110 Chollar.....	.75	830	Ophir.....	.12	.12	.12		
150 Con Va & Cal.....	2.00	200	Overman.....	2.15	.22	.20		
170 Crown Point.....	4.25	40	P. Sheridan.....	1.00	.8	.8		
250 Crocker.....	.90	50	Scos.....	.475	.6	.6		
250 Con Imperial.....	1.25	25	Seg. Belcher.....	.475	.6	.6		
700 Confidence.....	7.50	820	Savage.....	.61	.61	.61		
225 Challenge.....	2.00	500	Scorpion.....	.95	.95	.95		
1400 Caledonia.....	.80	750	Sierra Nevada.....	.44	.04	.71		
350 Eschweiler.....	1.45	61.50	Union Con.....	4.50	.64	.55		
240 Gould & Curry.....	.65	110	Utah.....	.74				
580 Hale & Nor.....	.61	110	Yellow Jacket.....	.65				

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, Feb. 17, 1887.	25	10	5	2	1
ANTIMONY—French Star.....	.94	@	8		
BORAX—San Bernardino.....	.—	@	5		
Armstrong.....	.—	@	5		
IRON—Glengarnock ton.....	.—	@	225	00	
Reglition ton.....	.—	@	240	00	
American Safe, No. 1, 1000.....	.24	00	24	00	
Oregon Pig, ton.....	.21	00	21	00	
Clipper Gap, Nos. 1 & 4.....	.22	00	22	00	
Clay Lane White.....	.21	50	21	50	
Shotts, No. 1.....	.25	50	25	50	
COPPER.....	25	@	—		
Bolt.....	18	@	23		
Sheathing.....	12	@	13		
Ingot.....	4	@	5		
LEAD—Pig.....	5	@	5		
Sheet.....	8	@	—		
Shot, discount 10% on 500 bag Drop, 1/2 bag.....	1.65	@	—		
Buck, 1/2 bag.....	1.85	@	—		
Chilled, do.....	.35	50	.39	50	
QUICKSILVER—By the Board.....	1	@	—		
Flasks, new.....	.85	@	—		
Flasks, old.....	.85	@	—		
STEEL—English, lb.....	14	@	15		
Black Diamond, ordinary sizes.....	10	@	—		
Flow.....	4	@	5		
Machinery.....	5	@	6		
Sanderson Bros.....	10	@	—		
ZINC—German.....	8	@	9		
Sheet, 7x3 ft. 7 to 10 lb. less the cask.....	4	@	4.50		
TINPLATE—Coke.....	6	@	6.50		
Charcoal.....	6	@	6.50		

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COMPANY.	LOCATION.	NO. AM'T. LEVIED.	DELT. DATE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Con M Co.....	Nevada.....	21.....	50, Jan 12, Feb 17.....	Mar 10, L. Osborn.....	379 Montgomery St
Andes S M Co.....	Nevada.....	31.....	25, Jan 24, Mar 3.....	Mar 23, B. Burris.....	309 Montgomery St
Bellion M Co.....	Nevada.....	35.....	50, Feb 9, Mar 15.....	Apr 5, W. H. Watson.....	302 Montgomery St
Bodie Con M Co.....	California.....	6.....	50, Jan 24, Feb 28.....	Mar 28, G. W. Sessions.....	309 Montgomery St
Benton Con M Co.....	Nevada.....	32.....	40, Jan 22, Mar 1.....	Mar 17, R. E. Grayson.....	337 Pine St
Camp Creek Placer M Co.....	California.....	1.....	10, Jan 20, Mar 10.....	Apr 14, G. W. Miller.....	306 Pine St
Dictator Con M Co.....	Nevada.....	1.....	01, Dec 15, Jan 22.....	Feb 12, J. F. Boller.....	Hawthorne Nev
Excelsior W & M Co.....	California.....	10.....	1, 50, Jan 3, Feb 3.....	Feb 21, W. J. Stewart.....	215 Sansome St
Four Hills M Co.....	California.....	1.....	25, Jan 22, Feb 28.....	Mar 21, F. S. Moody.....	323 Montgomery St
Golden Fleets Gravel M Co.....	California.....	8.....	10, 50, Jan 27, Mar 8.....	Mar 28, W. J. Gleason.....	310 Ebban Block
Hubert Concentrator Co.....	California.....	13.....	01, Jan 8, Feb 10.....	Feb 20, A. B. Brady.....	Grass Valley
Hazard Gravel M Co.....	California.....	1.....	10, Jan 17, Feb 20.....	Mar 14, M. Livingston.....	230 Montgomery St
Kinsaid Plat M Co.....	California.....	1.....	03, Jan 26, Mar 1.....	Mar 28, J. T. McGeehan.....	328 Pine St
Lone Jack M Co.....	California.....	1.....	05, Jan 27, Mar 7.....	Mar 28, J. M. Buntington.....	309 California St
Lady Washington M Co.....	Nevada.....	6.....	25, Jan 28, Mar 7.....	Mar 28, W. H. Watson.....	302 Montgomery St
Manhattan S M Co.....	Nevada.....	2.....	1, 00, Feb 2, Mar 7.....	Mar 22, J. Crockett.....	327 Pine St
Mexican G & S M Co.....	Nevada.....	3.....	25, Jan 4, Feb 28.....	Mar 21, C. E. Elliot.....	309 Montgomery St
Mountain Tunnel G M Co.....	California.....	3.....	15, Jan 19, Feb 28.....	Mar 18, J. W. W.....	310 Pine St
Mayflower G M Co.....	California.....	34.....	25, Jan 19, Feb 28.....	Mar 18, J. W. W.....	310 Pine St
North Comstock M Co.....	Nevada.....	2.....	10, Jan 13, Feb 14.....	Mar 1, F. E. Dietz.....	327 Pine St
North Belle Isle M Co.....	Nevada.....	11.....	50, Jan 12, Feb 15.....	Mar 9, J. W. Pew.....	310 Pine St
Occidental Con M Co.....	Nevada.....	1.....	30, Jan 11, Feb 10.....	Mar 3, H. Deas.....	309 Montgomery St
Navajo M Co.....	Nevada.....	1.....	25, Jan 7, Feb 10.....	Mar 10, J. W. W.....	310 Pine St
N Banner Con T Co.....	California.....	16.....	01, Jan 1, Feb 5.....	Feb 26, T. J. Mitchell.....	Grass Valley
Overman S M Co.....	Nevada.....	37.....	30, Jan 3, Feb 25.....	Mar 18, G. D. Edwards.....	414 California St
Occidental M Co.....	Nevada.....	8.....	40, Feb 3, Mar 10.....	Mar 31, A. R. Durrow.....	339 Montgomery St
Phelps Manufacturing Co.....	California.....	1.....	5, 00, Feb 12, Mar 21.....	Apr 5, W. H. Phelps.....	17 Drumm St
Pheuch Con M Co.....	California.....	2.....	1, 43, Jan 26, Mar 5.....	Mar 20, C. Colleschom.....	316 California St
Pennsylvania Con M Co.....	California.....	5.....	01, Jan 4, Feb 7.....	Mar 1, M. Byrne Jr.....	Grass Valley
Pneumatic M Co.....	California.....	2.....	20, Jan 4, Feb 14.....	Mar 8, H. Pichor.....	320 Sansome St
Sierra Nevada S M Co.....	Nevada.....	37.....	25, Jan 4, Feb 28.....	Mar 9, E. L. Parker.....	309 Montgomery St
Spring Valley M Co.....	California.....	2.....	24, Jan 22, Mar 5.....	Apr 4, H. Pichor.....	320 Sansome St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Alabama, Humboldt & Bailey Cos.....	Nevada.....	W. H. Watson.....	302 Montgomery St.....	Annual..... Feb 28
East Mt. Diablo M Co.....	Nevada.....	G. W. Fisher.....	318 Pine St.....	Annual..... Feb 19
Lucky Hill Con M Co.....	California.....	F. D. Black.....	27 Ellis St.....	Annual..... Feb 19
West Blue Gravel M Co.....	California.....	G. A. Benton.....	313 Montgomery St.....	Annual..... Feb 21

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.....	Nevada.....	A. W. Havens.....	309 Montgomery St.....	50.....	Feb 10
Martin White M Co.....	Nevada.....	J. F. Scoville.....	309 Montgomery St.....	25.....	Dec 20
Paradise Valley M Co.....	Nevada.....	W. Letts Oliver.....	328 Montgomery St.....	10.....	Nov 30
Silver King M Co.....	Arizona.....	J. Nash.....	328 Montgomery St.....	25.....	Feb 15

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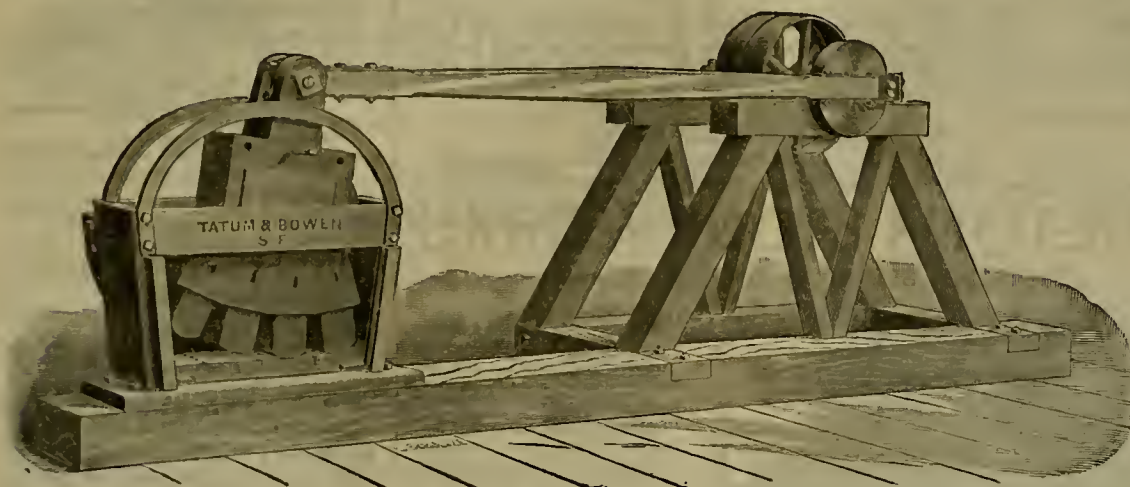
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Single Track Ore Car, - -	40 00

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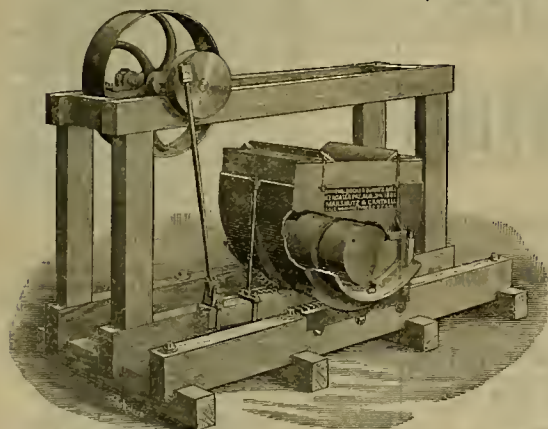
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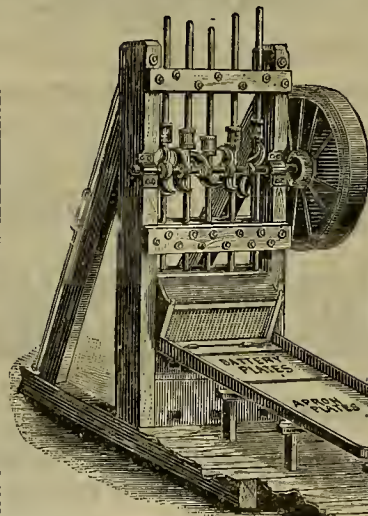
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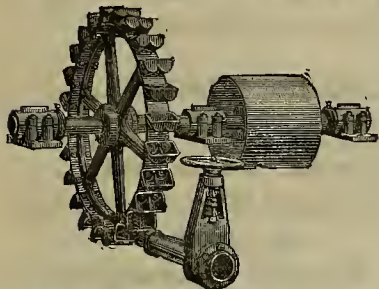
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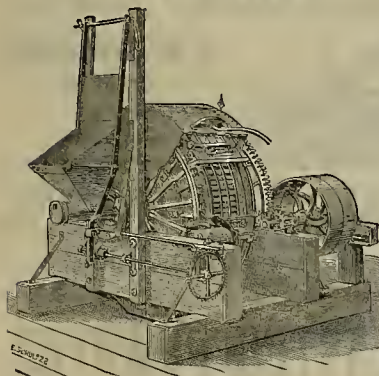
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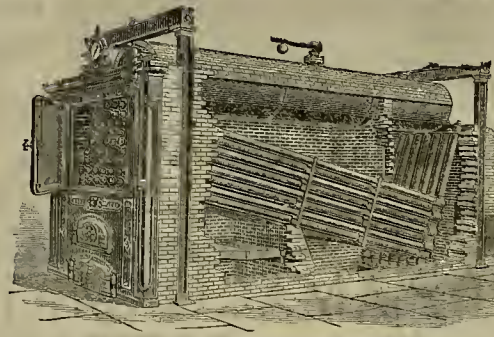
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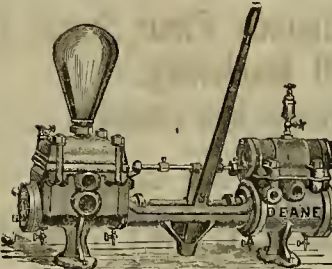
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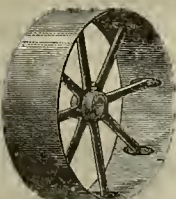
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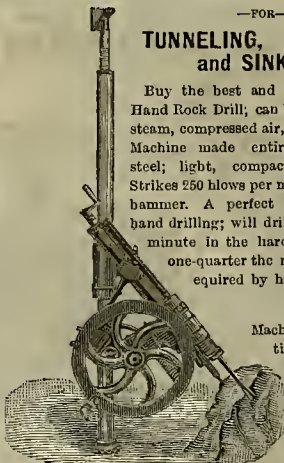
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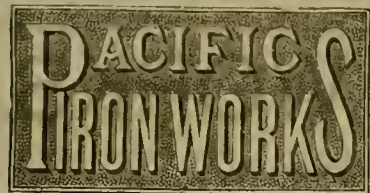
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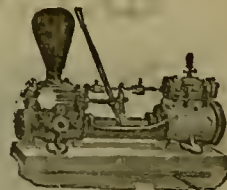
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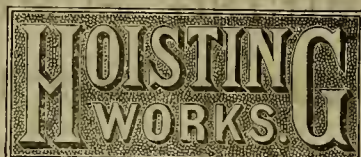
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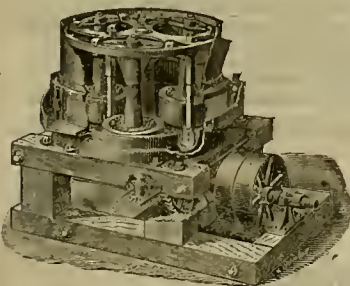
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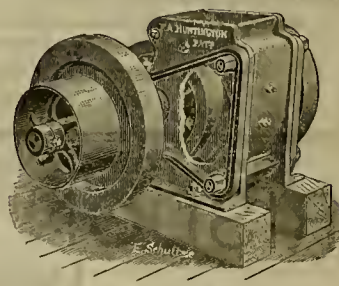
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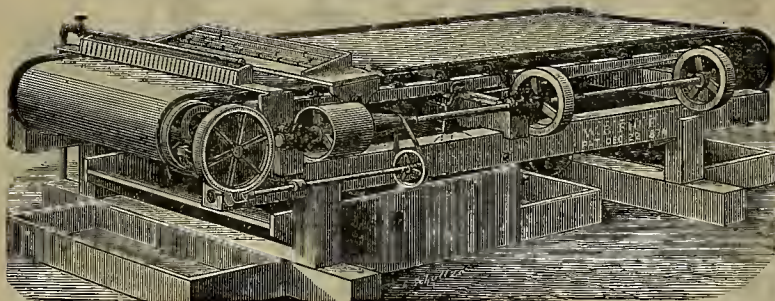
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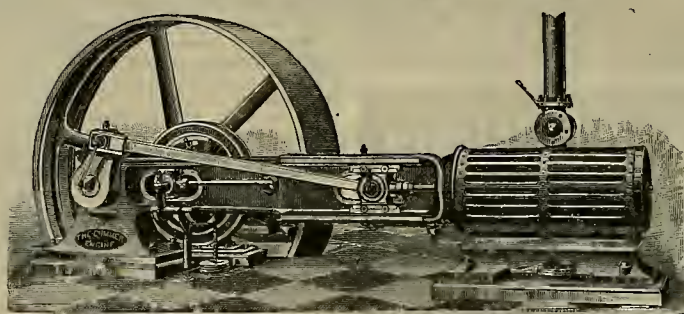
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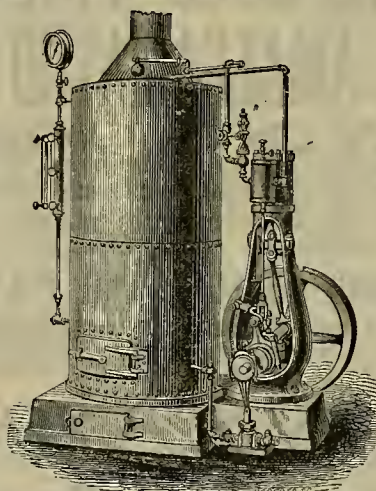
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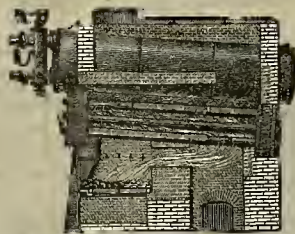
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
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SAN FRANCISCO, SATURDAY, FEBRUARY 26, 1887.

VOLUME LIV.
Number 9.

Pit Pumps for Deep Wells.

Deep-well pumping is one of the things that has been very greatly perfected in this State. The water-raising apparatus has been improved in order to admit of profitably lifting water for irrigating purposes, and for more valuable crops it is sometimes raised 100 feet. Centrifugal pumps are largely used, because where the water is drawn from sand and gravel, more or less of these substances come into the barrels of ordinary pumps and cut them out. There are plenty of good piston pumps, of course, but there are objections to them for irrigation purposes. The centrifugal pumps themselves were at first only applied for low lifts, and it was a common opinion in this and other countries they would only be employed up to lifts of 40 feet or so. The reason of this was that the mechanical impact of the runners, or the rotative energy of the water, was regarded as a principal factor on the pump's effect, and this effect diminished as the relative speed of the runners and the water.

This difference increases as the height, that is, the speed of the runners, has to be increased accordingly while the flow of water remains the same. At 10 feet the effect of rotative energy is more than a third, at 50 feet it entirely disappears, or ceases to be a factor that need be regarded.

The engraving on this page shows a centrifugal pit pump for raising water from wells. The pumps are arranged on a new method, the suction-pipes entering at the top of the pump, so as to be easy of access. The water being drawn into the top of the pump causes an upward thrust equal to the work, balancing the weight of the driving shaft, so the whole is in equilibrium. The pumps are made single, or compound with two runners, as the height of the lift may demand, single runners being recommended for lifts to 50 feet, and compound pumps for higher lifts. The compound pumps with two runners run 40 to 60 per cent slower than single pumps, and avoid the excessive speed required for high lifts. The shafting, couplings and bearings are of a special kind, made for the purpose, and of such weight as to balance the water column. These pumps are made from 2½ inches to 12 inches, the casing being strong enough to withstand a pressure of 50 pounds to an inch of area.

A plant similar to that shown in the engraving on this page, having a capacity of 2,000,000 gallons each 24 hours, with a lift of 57 feet, was furnished the California Nursery Company, at Niles, not long since, by the San Francisco Tool Company, of this city, makers of these pumps. A second one has just been shipped to the same parties. Among others of the same kind, the following orders have been filled: One patent pit pump to Henry Booksin, San Jose, capacity 1,500,000 gallons in 24 hours, lifting the water 95 feet; one to Wm. Farrington, San Jose, with a capacity of 1,500,000 gallons, lifting 70 feet; one to Francis Smith, Santa Clara, with a capacity of 51,000,000 gallons in 24 hours, lifting 50 feet; one to W. A. Aldrich, Aldrich Farm, Athlone, with a capacity of 2,000,000 gallons, lifting 37 feet. They are at present making two compound patent pit pumps for the Alameda Artesian Water Works—capacity, 1,500,000 gallons each every 24 hours, lifting 75 feet.

From these few instances it will be seen that these deep-well pumping plants furnished by

the Tool Company are of good capacity and can lift the water higher than it was formerly supposed that centrifugal pumps could.

Copper.

The outlook for an advanced price for copper this coming spring is not very bright. The great Lake Superior Company is delivering several million pounds this month and next at 11

amount exported by each copper producing section. Copper produced in one section goes to other works for treatment, is refined in another locality, so that its identity is entirely lost. For instance, copper matte made in Montana goes with material from other sources to the Argo Works of the Boston and Colorado Smelting Co., and, after extracting the precious metals, a part of it is sent abroad; another part is refined in the East and is sold to consumers. It

Arizona product, it is stated, is consumed at home. The more refining works we establish in this country the better it will be for our copper industry.

Metallic Manganese in Ore.

Very little has ever been done with what manganese deposits have been found in this State. In one instance last year a deposit was opened and several tons shipped from Santa Clara county, but it was found that the demand was limited here, and further work stopped. The distribution of manganese ores in this country is almost co-extensive with the deposits of brown hematite ore. At times the manganese displaces so much of the iron as to make the ore a manganiferous iron ore, while at other times, in close association with the iron ore, veins or pockets of manganese ores will be found. This statement is specially true of the hematite ore beds of the great Appalachian range from the northern to the southern extremity.

Though manganese is found in many sections, there are but three or four localities that are yielding any amount of ore. These are the Crimora and Mt. Athos mines, in Virginia; Cartersville, Georgia; and Batesville, Arkansas. So far as known the valuable deposits of manganese have been in pockets usually imbedded in a tenacious clay which requires washing to remove.

Most of the ores utilized in this country are oxides. Mr. Joseph D. Weeks, who has written an excellent article on manganese for the last Report on "Mineral Statistics of the United States," gives the following description of the four oxides utilized:

Protoxide—known also as the monoxide or manganese oxide. Multiplying the amount of protoxide in an ore by .7746 will give the metallic manganese in the ore.

Sesquioxide, braunite or brown oxide, is known also as manganic oxide. This oxide occurs in nature as braunite, and in the state of hydrate as manganite. This, in the form of braunite, is one of the most important ores of manganese occurring in this country. Multiplying the amount of sesquioxide in an ore by .6392 will give the amount of metallic manganese in the ore.

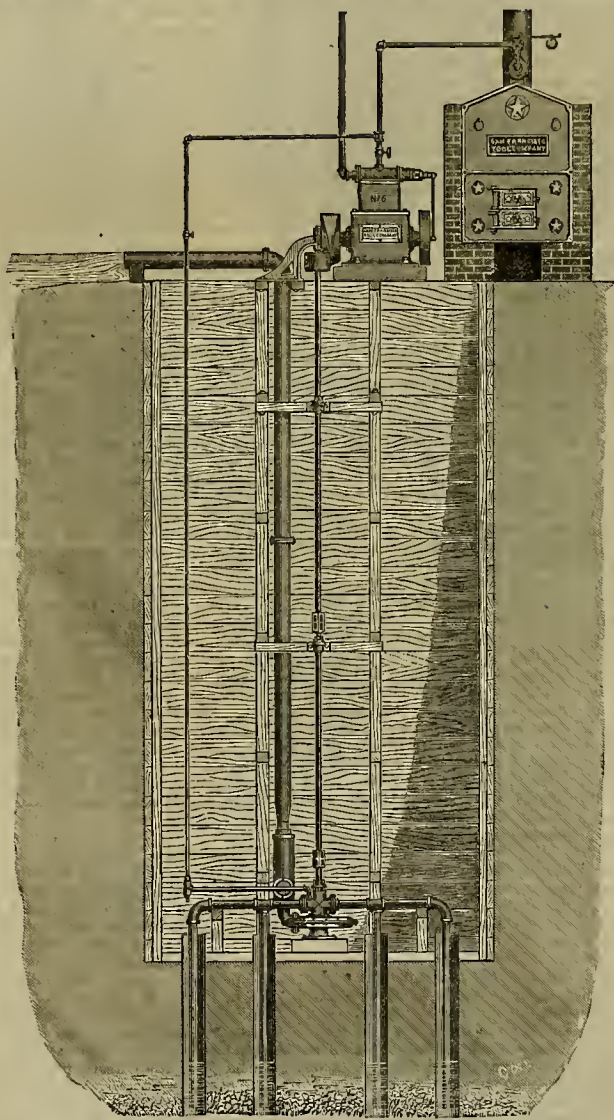
Peroxide, pyrolusite or black oxide, is, with braunite, the most common ore of manganese in the United States. Psilomelane contains the peroxide. Multiplying the amount of peroxide in an ore by .63218 will give the amount of metallic manganese in the ore.

Hausmannite is a brown manganese oxide, containing, theoretically, 72.1 per cent of metallic manganese.

THE erection of reduction works at Reno, Nevada, has given an impetus to private mining, and large lots of ore, from even remote camps, are being sent thither for shipment by individuals who have not the means with which to erect mills or furnaces.

THREE large stamp mills at Butte, M. T., closed down on the 20th for want of salt, and two more will close, thereby stopping work in all the silver and copper mines and throwing about 3500 men out of work. The trouble is due to the snow blockade.

THERE is more demand for mining property, and more sales have been made in New Mexico and Arizona in the last six months, than there has been for several years.



CENTRIFUGAL PIT PUMPS FOR IRRIGATING WORKS.

cents, it is true, but the impression prevails that the coming summer will see the price at 10 cents, as it was last year. Of course, in case of a war in Europe, the market might be influenced so as to keep prices up. The Arizona mines, with the disadvantage of long distance from, and high freight to, commercial centers, need a better price to make much money. They can make a profit, however, even a cent below the present price, but with such competition as the Montana and Lake Superior mines, will have to look sharp after expenses.

We produce a vast amount of copper in the United States, which is sent to foreign markets. It is very difficult to get at the exact

will be seen the original source is uncertain.

The refiners themselves, receiving furnace material from many quarters, ship ingot to Eastern markets, and they probably could not, if they desired it, ascertain whether it was Montana or Arizona product. The figures for exports, furthermore, do not exactly tally with the shipments from some localities like Montana, because varying quantities are in transit from the Rocky mountains to the Atlantic and Pacific coasts. It is a matter of moment to the different producing sections to obtain some clear conception to what extent its product is placed on the more valuable home market, since export shipments imply a sacrifice. The bulk of the

Treatment of Black Sand.

The following is a brief description by J. F. Sanders, in the *Arizona Enterprise*, of treatment of concentrations, as obtained from placer mines, and many gold ores: There are two methods of treatment, the first by acids—the wet way or analysis—and the second by fire or dry way.

First—The wet process or analysis, as furnished by Bruno Kerl, is one which gives absolute accuracy, but requires considerable skill and experience. The concentrates are dissolved in aqua regia (one part of nitric and two parts of hydrochloric acid); when completely dissolved a solution of manganate of potassium is slowly added, which precipitates the iron, etc., as oxides. This precipitate is filtered off and a current of sulphuretted hydrogen gas is passed through this neutralized solution until yellowish crystals of sulphur appear in the same. The resulting precipitate is of a dark-brown color and contains gold, silver, platinum, copper, bismuth, tin, cadmium, etc. (of course, provided that these metals existed in the concentrates). The precipitate is now freed from the solution by filtration or decantation, and then alternately treated with nitric and hydrochloric acids. In this manner, silver, copper, tin, bismuth and cadmium are entirely dissolved and thus taken out of said precipitates, and only gold and platinum remain. Diluted aqua regia will now dissolve the gold, and none, or but very little, platinum. This solution is then evaporated to nearly dryness to remove acids, and then again dissolved in pure water; the gold may now readily be precipitated by a solution of ferrous sulphate. The ensuing precipitate is dried and weighed, or may be first smelted into a button of pure and solid gold.

Another method, which gives very good results in gold out of these concentrates, is practiced by the jewelers to obtain the gold from the filings, etc. Such filings contain, besides gold, large quantities of steel, iron, and some silver, copper, etc.

By this method, as above, a certain quantity of concentrates is weighed out and then dissolved in aqua regia. When dissolved, a little sulphuric acid is added to the solution, and some iron nails or other suitable pieces of metallic iron are introduced into it. The ferrous sulphate is thus produced in said solution, and the iron, chrome, etc., is suspended in the acidulated solution, and only gold and some little iron are precipitated after some time, and is generally finished in from 10 to 15 hours. The precipitate is the same as above, and is, like it, dried and smelted into a button and weighed.

To dissolve the gold in aqua regia and then precipitate it out of such solution directly by ferrous sulphate, as practiced for pure gold, or metallic alloys of gold with silver, copper, etc., does not and cannot give any results for such mixtures of metals and metalloids as are found in the above concentrates, or the so-called black sand.

Second—The dry way or fire process. The best, quickest and most practical process (thus far) of obtaining good results in gold from the concentrates in question is the hydro-oxygen blowpipe, invented in 1797 by Prof. Hare, of Philadelphia, Penn. In a furnace constructed by M. St. Clair Deville, of Paris, France, a charge from a very little up to 100 pounds, properly fluxed and mixed, is completely reduced in from 20 to 60 minutes. This process has not only the advantage of giving the greatest pyrometric effect, but also by its oxygen gas may at any moment be put on in excess, and thus the operation be changed from a reducing to an oxidizing smelting, and vice versa. When such concentrates contain any bismuth, tin or other desirable metals that are likely to be oxidized, they are extracted by lixiviation before smelting, if possible. The regulus is then refined in the usual way in case platinum, silver, etc., were present in the original charge.

The ordinary silver assay, as is commonly practiced, gives very unsatisfactory results, because these concentrates contain 40 per cent of metallic iron, and usually a still larger amount; and these oxides of iron, with chrome oxides, etc., inclose to a great extent the fine particles of gold—both of some native gold and sulphide of gold. This fact may readily be seen by placing some of such concentrates under a powerful microscope, which will thus show particles of gold protruding out of the sides of some of the grains of concentrates. Again, by dissolving some of the larger pieces of concentrates in nitric acid (some pieces may thus be dissolved) a residuum of very small particles of gold will result in most cases. Moreover, in many placer mines large pieces of iron are found which have native gold, visible to the naked eye, on them or protruding out of them.

It is an absolute fact that in a common assay furnace, hardly ever sufficient heat is produced to smelt such iron ores, or to fuse to such an extent that the mass becomes sufficiently liquid to permit the gold to settle out of the slag to the bottom, or to come in contact with, or be absorbed by, the test lead. Moreover, the lead employed in an assay of such concentrates fuses and settles to the bottom of the crucible long before the iron in the same has even become a thin paste or is fused, while the smaller particles of lead are held suspended in the half molten mass. According to good authority, it is all a large blast furnace can do to reduce

such ores even in small quantities added to other ores that fuse easier.

In order to obtain better results by the ordinary assay, it is well to roast such material very carefully and in a good heat. The particles of iron, while thus taking up more oxygen, break into smaller pieces and some of the gold is freed from its inclosures, pulverizing to an extremely fine powder and then fluxing for and smelting at a tolerable high degree of heat. In smelting, oxidizing fluxes should be added from time to time, until sulphur fumes cease to escape. The smelting mass should be stirred up at intervals, and then, finally, a charge of litharge is added. When the mass fuses quietly again, or is well fused, it is poured off, and the regulus treated in the usual way.

Another way which gives approximate results, is to treat the concentrates before smelting alternately with nitric, hydrochloric and sulphuric acids, taking care that no aqua regia is formed, which would dissolve the gold. Much material that interferes with the bringing out of gold is thus removed; it is then again dried, pulverized and smelted as above.

In the Ural mountains, in Russia, and other places in the same country, the concentrates are obtained by this sweeping process since 1824, which has been a success both in a financial and technical way.

Cheap Ore Treatment.

The following is condensed from an article by T. J. Hough in the *Golden (Colo.) Transcript*:

Since the opening of this new year a number of bona fide transfers of gold-bearing lode properties, located in undoubted gold-bearing localities, have been reported. The two most noted transfers occurred at Idaho Springs, and which conveyed very rich gold-bearing lodes in the new gold belt of Soda creek. These properties referred to have been successfully worked for a number of years, but not with the profit that mill-runs and sample assays of the ore would seem to warrant. This is owing to the vast quantities of low-grade ore, or gangue, associated with this high-grade or smelting ore, which alone can be profitably shipped by rail, at the present freight rates, 20 or 60 miles to the smelters for treatment. Below \$30 a ton, dry gold ore is practically valueless to the miner, as the high prices usually charged by the smelter for treatment, combined with rail and cartage charges, leaves little or no margin to the mine-owner and miner or leaser, as the case may be. The great loss to miners consequent upon their inability to turn low-grade gold ores to profit has long been fully appreciated; but outside of Black Hawk practically nothing has been done toward building extensive stamp mills for the reduction of gold ores. Efforts have been made, it is true; but, with the possible exception of the English company's mill at Fall River, above Idaho Springs, the Barber mill on Soda creek and a ten-stamp water mill on Chicago creek, wreck and ruin mark the sites of blasted hopes and wasted ducats. The cause of failure must be sought elsewhere than with the mines and the miners. A ton of ore that will assay \$20 gold should yield, by the most careless treatment under stamps, \$10. Allowing six tons to the cord of surface gold ore (it is oftener eight), we have \$60 as the product of one cord. A battery of heavy stamps, such as is in use in Gilpin county, will reduce one ton of ore every 24 hours, if properly tended. A mill of ten such batteries would reduce ten cords a day and 260 cords a month, which would yield \$600 a day, \$15,600 a month of 26 days, and the handsome sum of \$187,200 a year, from 18,720 tons of mill-dirt that to-day is valueless owing to the want of a cheap method of treatment.

The old-time stamp mill in use in Gilpin and Clear Creek counties, for cheapness and efficiency in reducing gold-bearing rock to a pulp, is not excelled by any other method yet discovered. The only difficulty to be overcome in the successful treatment of the low-grade ores so abundant in the gold districts of the above counties is the great cost of the power necessary to keep the stamps in continuous and steady motion all the year round.

Water-power is both cheap and efficient where practicable, but no gold district in either of our neighboring counties can depend on water as a motor for more than seven months in the year. Steam is out of the question except for exploring and experimental purposes in the treatment of surface auriferous ores, the cost being so great that only the most urgent necessity should ever induce the erection of steam mills for the reduction of precious metal ores by the stamp process.

This article is written with the desire to attract the attention of capitalists to the vast unappropriated water-power of Clear Creek canyon, which can best be utilized for the production of a force in a conductive form for many miles from the place of generation without losing any of its energy, and this can only be done cheaply in the present state of scientific knowledge by means of compressed air.

THE U. S. Senate has passed the bill giving to California, for school purposes, 5 per cent of the sale of all public lands since California became a State. It is estimated that this will bring the State about \$500,000. It is said that there is a very good prospect that the bill will be got through the House.

THE 22 quartz mills in Storey county, Nev., crushed during last year 228,743 tons of ore,

Carbonate Hill.

The New Southern California Mines.

Messrs. Hampton, Wason, Smith and Halvey returned from the mining regions Saturday evening and bring encouraging reports from that section. Martiu Halvey, a mining expert sent out by a Los Angeles company, gives his opinion about as follows:

I am a mining man of many years' experience and may be called an expert upon the subject. I have visited about all the mining camps on the Pacific Slope—Virginia City, Grass Valley, Ivanpaw, Calico and others—and must say that I have never seen anything in my life to compare with these mines discovered by Col. Smith. The whole country seems to be full of gold and there is room for a great many miners. The claims shown me by Col. Smith beat anything I ever saw. I am satisfied that this is a continuation of the Calico belt. I shall return to Los Angeles to-morrow with some specimens of ore I obtained over there, and will return to the mines in about two weeks. The company I represent will undoubtedly put in a large mill in a very short time, but I am not prepared to give other particulars at present.

The party located several claims, from which they bring very rich specimens.

About 150 men are in the camp now and more coming in every day. J. V. Jesse, surveyor of Santa Maria, has been engaged during the past week in laying off the town site of Lexington. Several lots have been sold and a lively mining camp will doubtless spring up in a few weeks' time. The town is situated at the northern base of Alamo mountain, at the junction of the Piru and Lockwood creeks, and covers 640 acres. Pine timber and water are there in abundance and parties contemplate putting up a sawmill. Miners from all parts of the State are flocking in, and soon the camp will boom in earnest.

The country for several miles square contains rich mineral matter, and there appears to be room for a great many more claims; several parties have taken up placer claims. A party will leave Ventura some time this week for the mines by trail, and later a four-horse wagon-load of provisions, tools, etc., will be sent over. Some of the specimens brought in have been tested and found to be very rich in gold and silver.

The parties who seem to have located the richest claims so far are Messrs. Chas. Wason, Col. Smith, J. D. Hampton, Mr. Halvey, W. H. Reilly and DeMoss Bowers.

Since our geological reconnaissance several years ago, we have been convinced that somewhere near the head of the Piru creek was a ledge of rich gold quartz from which came the deposits in that stream. We shall not be greatly surprised to learn that the section alluded to yields a wonderfully rich harvest to the miner. Of course no one can fully determine the value of this find until it is scientifically tested; but the experts who have examined the locality each and all claim that it is rich in the precious metals. We do not want people to go there on our recommendation, but we have sufficient faith in it to have a claim recorded and expect to have it worked in due time. We learn that parties who have had much experience in mining will put up a 50-stamp mill soon, and the probabilities are that by the time the rainy season is over there will be several hundreds, if not thousands, of miners in the new town of Lexington prospecting for gold. If any one interested will call at our office, we will show him specimens picked up from the surface of our claim, carrying plenty of free gold. But we repeat that the only way to know certainly what it is worth is to have it tested by a competent assayer.—*Ventura Free Press*.

AT BALLONA.—Work at the lake is just beginning with a vim. The schooner Conner is lying off shore some distance with a cargo of 250,000 feet of lumber (piles), and she is now discharging by floating them ashore. A donkey engine is on the beach ready for operation. A heterogeneous mass of bolts, bars, ropes, etc., is heaped all around. No piledriver was in sight, but there is one somewhere, which will be in position as soon as needed. The tide flows in and out through the channel that has been cut between the lake and the ocean. The water at high tide is from five to six feet deep. It will be a herculean labor to make a harbor down there, but no doubt money, energy and capital will do it. In the mean time we understand that it is the intention to project a wharf out into the ocean. This will bring ship and rail together, as it used to be at Santa Monica. The grading of the railroad to Los Angeles is to be completed by the first of June, which will give ample time for the completion of the wharf. The indications are that the locomotive and the steamship will mingle their smoke not later than the first of July at La Ballona.—*Santa Monica Outlook*.

SENATOR STANFORD appears to have caught the prevailing infection in regard to appropriating money for coast defense. In furtherance of this object the Senator has introduced a bill to provide for plants, to cost not less than \$1,000,000 each, to be established by private parties at San Francisco, Birmingham, Ala., Pittsburg and South Boston, who are to be given contracts to build such mortar guns or other armament as the service, army and navy, may from time to time require.

American vs. Russian Petroleum.

There has been some fear expressed of late, lest the Russian oil wells at Baku might supersede American petroleum in the markets of Europe; but a recent English writer sets all such fears at rest by the following, which we take from quite a lengthy article upon the subject in a late number of the *Pall Mall Gazette*:

1. United States crude petroleum-oil is to Russian crude as cream to skim milk. United States crude yields about 75 per cent of the finest illuminating oil the world produces. Russian crude yields only about 29 per cent of an inferior illuminating oil. United States crude yields about 12 per cent naphtha or spirit of such a valuable character that it readily sells for 20 per cent per gallon more than the oil. Russian naphtha is unmarketable and it is mostly burned to get rid of it. United States lubricating oils, another product of crude, are now so low in price that Russian lubricating oils are practically debarred from competition in many of the European markets. United States crude yields a considerable percentage of scale, used for candle-making, and this is a product of great value; weight for weight it is worth four times more than refined petroleum oil. The Baku crude yields no scale. Thus the United States in the surpassing richness of its crude has an enormous and unapproachable advantage over Russia.

2. The daily production of the United States is in excess of the world's demand, and has been so practically for the last 10 years. In addition to the excess in the daily production of the United States, there are stored there, above ground, 31,800,000 barrels of 42 gallons each, the actual unmarketed accumulations.

3. United States oil is superior as an illuminant to Russian oil. A comparison of the respective prices of the United States and Russian oil at the chief European markets will show the commercial appreciation of the superiority of United States oil.

4. The United States command the available markets of the world with an organization backed up with immense resources, economic, complete, perfect, the power of which the Russian industry now knows to its cost. (In 1876 the United States refiners sold their oil at 33 cents per gallon; recently their price has been 6½ cents per gallon, barrels included, and yet the American companies pay good dividends, and the shares for the greater part command high premiums.)

The writer of the above further says that the Baku petroleum trade is said to be in the throes of a crisis; that it has for the past few years been laboring under extraordinary pecuniary difficulties; that prices for Russian crude and its products have declined to such a low figure that sales, except at a loss, are difficult to make; and that over 40 of the Baku refineries were recently closed, and many others partially so, all of which is attributed to the reckless manner in which the Russian trade has been forced in the effort to compete with American oils in the European markets. As to the large production, the writer says that an official government statement reports the territory in which the remarkable well is located as showing "evident signs of exhaustion."

MR. WILLIAM DODGE, JR., some of the Baku Divids mine-owners, and a few other Oakland parties, have lately purchased from a Chinese company the bar in the Middle Fork, known as Boston bar, and have arranged with the owners of Horseshoe bar to purchase that also. This gives them nearly two miles of river-bed to work. They intend cutting a tunnel under Horseshoe bar, the length of which need only be about 180 feet, and large enough to carry all the water in the river, which is there very crooked, and, as before stated, gives them nearly two miles of river-bed to work, most of which has not been worked for 20 years. They have lately filed articles of incorporation under the name of the "Horseshoe Bar Mining Company."—*Placer Argus*.

THE editor of the *San Mateo Times and Gazette* has put on foot and has urged with perseverance a movement to create a park in the redwood forests. The object is to perpetuate, through the instrumentalities of a State law, a large acreage of redwood forests as a public resort and as an evidence of the beauty and magnificence of the famous tree. A bill to this effect is before the Legislature. A very good place would be the fine grove near Russian river, where the Bohemian club has of late years held its "Midsummer Jinks." The trees are fine and large, and the place is a favorite for campers, as it is readily accessible from the city by rail.

STOPPED FOR WANT OF FUEL.—Several of the smaller quartz mines of this district have been compelled to suspend operations on account of the difficulty and expense of obtaining fuel. The winter was so mild up to the first of the present month that it was supposed there would be no trouble in getting wood as required, and hence they have been "caught out" by the succession of storms that have invaded the "Bartlett Pear Belt" in the last few weeks. But the gold in the ground will not diminish in quantity on account of being buried beneath the snow, and the miners will renew their boom when the spring opens.—*Grass Valley Union*.

Efficiency of Different Forms of Boilers.

At a recent meeting of the Engineers' Club of Philadelphia, Mr. John E. Codman presented an account, illustrated by blackboard sketches, of the results obtained from the recent tests of the efficiency of different forms of boilers now in use by the Philadelphia Water Department. The boilers first tested were four in number, and known as double-decked, a popular form in Philadelphia, and supposed by many to be an economical steam generator. The lower boiler generally contains about as many tubes as the tube sheet will safely hold; the upper boiler, or drum, is connected to the lower one by two or more necks, and the water is usually carried so as to half fill the upper drum. In the trials mentioned, the height of water was measured from the bottom of the upper drum. For 16 hours it was kept at 5½ inches from the bottom, and for 8 hours at 12½ inches from the bottom. This difference is not very great, but the results obtained show the advantage of keeping the water as low as possible in the upper drum, as, with high water, much that is obtained is only apparent evaporation.

Some discussion followed. President Washington Jones said: "In the so-called double-decked boilers, the contracted passages or necks connect the upper and lower sections, through which the steam formed in the lower section rises to the upper one with such a high velocity as to carry entrained water, which passes to the steam pipe and is credited as steam, unless the calorimeter test reveals its presence. This disposition to carry water is augmented by the increased velocity of the ascending steam, caused by the injudicious crowding of the tubes nearly to the top of the lower section, and by insufficient space between the vertical rows, so that the passageways through the necks are thereby obstructed. The better practice is to omit such tubes as come immediately under the necks, leaving a space of several inches (say one-half the diameter of the necks) between the shell at the necks and the adjacent tubes, so as to obtain a more quiet liberation of the steam bubbles. The necks should be of limited diameter, ordinarily from 10 to 14 inches, so that the strength of the shell shall not be impaired by the holes cut in it to match the necks. More than two necks are injurious, as the upper and lower sections should not be rigidly bound together, but should be permitted to alter their parallelism if unequal expansion demands it. The greater quantity of steam formed at the front, or furnace end, of the boiler should establish a circulation upward through the front neck and downward through the back neck. This, however, is evidently not the fact, as the quick and frequent fluctuations of the water line, shown by the glass gauge, prove. When a volume of steam greater than usual is generated in the front end of the boiler, the quickened ascent of the current causes a larger quantity of water to flow through the front neck into the upper section, and the water line rises momentarily at the end of the section, and is so shown by the glass water gauge; meanwhile, the water is passing down the neck at the back end. When the ebullition at the front becomes quieter, and the upward current slower, the water line falls to a level, or possibly below it, at the front end, if the back neck is giving a passage to steam formed at the back end of the boiler, and so reverses the currents. One requisite of the first importance to the evaporative efficiency of a boiler is the production and maintenance of a constant current of water, passing without change of direction, over the heated metal surfaces, so as to sweep off the steam bubbles adhering to those plates, and bringing into their place fresh particles of water to be, in their turn, converted into steam bubbles."

HODGDON, of Eureka, Nevada, who was acquitted of the charge of arson by the court the other day, was given a ride on a rail by the miners of that camp, and ordered to leave. The charge was that Hodgdon attempted to set fire to the Geddes & Bertrand Hoisting Works, in Secret Canyon, by pouring upon the shingles around the smokestack a large quantity of turpentine, and that giant or Hercules powder had been cut up and pressed under the shingles. These explosives were also saturated with turpentine, and were placed around and near the smokestack and in the immediate vicinity of a number of pitch pine sticks that had been emersed over with giant powder, and in the crevices of which matches had been placed. The supposition was that these had all been placed so that the heat from the smokestack would ignite them and cause an explosion, and through that means destroy the hoisting works and at the same time kill Engineer Dennison, with whom Hodgdon had some trouble in regard to a mining patent. There was not sufficient evidence to convict the prisoner, but the miners of the camp thought him guilty.

A COSTLY CATHEDRAL SINKING.—St. Isaac's, the great cathedral at St. Petersburg, which was finished in 1859 and cost over \$25,000,000, is slowly sinking into the ground, and the authorities do not know how to stop it. Possibly they might learn a lesson from the American engineers who arrested a similar settling of the Washington monument, the highest artificial structure on the globe.

Yerba Mansa.

We give on this page an engraving of a native plant which, no doubt, many of our readers have observed, as it is quite a conspicuous plant and sometimes occurs in considerable masses, especially in the Southern counties, although it is widely distributed over the State. It is found in moist places and is most abundant where there is a tinge of alkali in the soil. It is a plant of valuable medicinal properties, and, for the purpose of giving opportunity to test these, some of the plants were set in the medicinal division of the Garden of Economic Plants at Berkeley. The root stock of the Yerba Mansa was much employed by the Indians as a remedy for a number of bodily ailments, and was probably most useful in diarrhea because of its astringent

cal receptacle above the involucre. They are very small and numerous, each with a small, whitish bract at its base. Each flower has six to eight stamens, and three or four spreading stigmas joined below in a many-seeded ovary.

The Elsinore (San Diego) News contains the following important information: Parties at work in the shaft being sunk by J. D. Hoff & Co. for coal were successful the latter part of last week in striking coal of a very good quality. This gave them new energy and encouragement, and they went on sinking for other veins which Mr. Hoff, who is well versed in the nature of coal fields, was confident would be struck. The second vein was struck at 118 feet, and is 20 inches in thickness and of extraordinary quality, being very hard and bright. Between each vein is found a layer of clay, also of superior quality. The 20-inch vein Mr. Hoff proposes to work, and at



YERBA MANSA—Anemopsis Californica.

properties due to the amount of tannin contained in it.

We reproduce this engraving of the Yerba Mansa from the report of Dr. Vasey, Government botanist, in the Department of Agriculture Report for 1885. The botanical name of the genus *Anemopsis* was given because of the resemblance of its head or cone of flowers, with its white involucre, to an anemone. The plant is an herbaceous perennial, and grows in California, Arizona and Northern Mexico. It belongs to the natural order *Piperaceae*. It has a thickish, creeping root-stalk, which has a pungent, aromatic, and astringent taste. From this proceeds a number of oblong or elliptical leaves, from two to six inches long and half as wide, on stalks as long as the blade. These leaves are entire, obtuse or obtusish, with a thick midrib and a two-lobed or heart-shaped base. From the same point also proceed one, two or three flowering stalks, six to eight inches high, which are naked below, near the top producing a broadly ovate, clasping leaf, and one or two leaves like the radical ones, but smaller, terminating with a conical, compact flowering spike, one-half to one and one-half inches long. This flower spike has at its base an involucre of five or eight whitish, oblong leaves, which look like petals, and are about an inch long. The true flowers are on the con-

the same time continue the sinking of the shaft, which be thinks will reveal much greater beds of coal. In the Chaney coal mine, being one and one-half miles distant, five veins have been struck, and it is on the fifth that they are now working. In that mine each vein was better than the one just before; this will undoubtedly be the case in the latter discovery, as the veins are thought to be a continuance of the former discovery. Judging from the quality of the coal of the second vein, and as each vein grows better, the fifth will be equal to imported coal. The clay, which will be excavated and pressed into brick, will pay for the mining of the coal. Machinery sufficient for hoisting 200 tons per day will be immediately procured.

THERE is an awakening at Eureka, Cal., in the redwood timber purchase. Lately thousands of acres of timber have been bonded to representatives of Western and Northwestern capital, and other speculators who live beyond the Mississippi are on their way here. In many instances the late holding prices have been doubled. Minnesota, Wisconsin and Michigan speculators take the lead in bonding for purchase.

THE six petroleum wells at Puente are now yielding 100 barrels a day.

MINING LEGITIMATE.—Many people do great injustice to the investor in mining properties or prospects when they call him a "gambler" or "speculator." There is a large element of chance in mining, but that element exists in a greater or less degree in almost every one of the occupations called legitimate. Speaking of the chances one takes in making an investment, an exchange truthfully remarks: The miller lays in a big stock of wheat in the hope that the price of flour will advance while he is grinding it. The wholesale grocery merchant buys a large stock of sugar when it is cheap and stores it away in anticipation of an increase in market value. The clothing merchant purchases a large invoice of overcoats in the hope and belief that the winter will be long. All of these are speculators in their various ways. The miller may find the price of flour, when he comes to sell, lower than it was when he bought this wheat. The grocer may be caught with a large stock of sugar on hand when there is an unusually good crop of cane. The winter may be short, and the clothing merchant may have to sell his overcoats at a loss. They take the chances of making or losing money. The mine-owner also takes chances. He has put his money into a piece of property which may or may not develop a crop of precious metal. If it does, the chances are that his reward will be much greater than it would have been had he invested his capital in any other enterprise. The man who buys a piece of property with the intention of digging in it for gold or silver is no mere a "gambler" than the man who cultivates the soil in the hope that it will bring forth a good crop of grain. Mining is as legitimate as any other business enterprise.

HISTORICAL SOCIETY OF CALIFORNIA.—This society, at its first annual meeting, elected the following officers: President, John T. Doyle; Vice-Presidents—William Ashburner, Edward S. Holden, J. De Barth Shorb; Secretary, Bernard Moses; Treasurer, Joseph A. Donohoe; Committee on Publication—John T. Doyle, Bernard Moses, F. E. Perkins; Directors—William Ashburner, Horace Davis, Joseph Donohoe, John T. Doyle, Ralph C. Harrison, Edward S. Holden, John R. Jarboe, Bernard Moses, William Norris, J. De Barth Shorb, A. Varsi. After the election of officers, President Doyle called the meeting to order and the regular business was proceeded with. The Printing Committee reported that it had arranged with Mr. Boequet for printing the society's annuals. Treasurer Joseph A. Donohoe's report showed that the finances of the society were in a healthful condition, there being a balance of \$478.20 carried forward from last year.

THE TEREDO.—W. H. Dall, curator of the Department of Mollusks, U. S. National Museum, writes as follows to the San Francisco Chronicle: "In yours of the 23d of January is a long, and for the most part, accurate article on the teredo; this name being taken in the general sense of referring to the whole group of timber-destroying mollusks colloquially so termed. But the writer has fallen into an error which is worth correcting. The siphonal end of *teredo navalis* which he copies from Appleton's Cyclopaedia, is correctly drawn and named. The animal which hores the piles in San Francisco harbor, and which is figured in the same article, is not the *teredo navalis*, but a *xylotrypa*, probably the *x. pennatifera* of Blainville. The teredo does not have the feather-shaped processes near the siphonal end (which are called pallets by naturalists), but has an oval or spoon-shaped pair, as represented in the figure copied from the cyclopaedia."

SENDING ABROAD FOR STEEL PLATES, ETC.—The importance of the new discoveries and heavy plants for large steel products is comprehended by only a very few, even among our extensive workers in steel. The fact also that our own foundries and shops are not fully up to the demands of the times in these matters has recently been forcibly brought to the attention of the public, by the reports which come from those building the new cruisers that they cannot obtain the steel for shafts in this country. We are told that the Messrs. Crampe will have the shafts for the vessels which they are to construct made by the great English steelmaker, Whitworth, while the Union Iron Works, of this city, has been obliged to order similar work from Krupp, the German cannon-maker.

L. J. HANCHETT is the general manager of the Manhattan property for the new company. It is the intention to begin work soon in adding new improvements, and increase the capacity in the reduction of ore. Four Hamilton mills will be set up in the old Boston mill, after it has been thoroughly overhauled, and 12 concentrators, some of them Frues and one or two of the Richmond patent, will be tried. The company will discontinue the lease system and put on day's pay men to develop the mines. The old furnace of the mill will be replaced by a Howell & White furnace, with driers attached. The mill will be repaired from top to bottom.

DURING January the Drumlummon mine, Montana, ten-stamp mill crushed 456 tons of ore, yielding \$24,500; the 50-stamp mill crushed 2670 tons, \$117,500; the 60-stamp (low-grade) mill crushed 2646 tons, \$38,000; a total of 5772 tons, yielding \$180,000.

THE population of the State has increased considerably in the year 1886, between 30,000 and 40,000.



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SAN FRANCISCO:

Saturday Morning, Feb. 26, 1887.

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Passing Events.

The stormy weather has continued, and, on the mountains, has caused great inconvenience, delaying trains, causing accidents, and putting a stop to a great deal of outdoor work. Up in Nevada county, the accumulation of snow in some of the ditches has had the effect of shutting off water from the mines, resulting in a temporary shut-down of several properties. The miners have had to quit work.

In Montana they have had to shut down a number of mills and mines, because the railroads were unable to bring further supplies of salt. Several thousand miners are thrown out of work temporarily.

The new mines in Ventura county are attracting some attention just now, and it is expected that there will be quite a rush in that direction in the spring.

There is a decided movement among the towns in Northern and Central California to take steps to advertise the resources of their respective neighborhoods, so as to attract some of the immigrants now coming in such numbers to the southern portion of the State.

Severe shocks of earthquake have occurred in Southern Europe, and many buildings have been demolished. There has been some loss of life.

THE Santa Maria Times says: R. B. Harper, a mining expert, who has been investigating the gypsum deposits at Pt. Sal, has been engaged by a number of our citizens to make a report on the new Peru mining district.

A More than Arctic Winter!

The countries occupying the great Rocky Mountain plateau are being visited by a winter of unusual severity. It is more than Arctic, in that the excessive cold and the heavy fall of snow have been accompanied by a succession of terrific blizzards, which, causing the snow to drift badly, have added greatly to the dangers and discomforts of the situation. The winter of high latitudes, though long and cold, is still and silent. There being no strong winds, the snow never drifts badly, but lies as it falls—very deep, to be sure, but evenly distributed over the surface of the ground. But in these countries situate along and adjacent to the slopes of the great Cordillera the wind very often blows a perfect gale in the winter, moving sometimes at the rate of 60 or 70 miles per hour. With this velocity it takes up the snow bodily and hurls it into great heaps, leaving the ground in many places bare. The ravines everywhere and the deep cuts on the railroads are filled up, impeding transportation both by wagon and rail and rendering it often for weeks at a time wholly impossible. In Montana the thermometer has on different occasions during the present month ranged from 40 to 60 degrees below zero—a degree of cold, this, that, of course, severely tests the capacity of these useful instruments. The snow, where not disturbed, varies from four to eight feet in depth, being much deeper on the mountains. The obstructed condition of the roads has caused much suffering through lack of provisions and fuel. Many people have already been frozen to death, and some have died for want of food. That the number perishing from these causes will be largely increased there is reason to fear should the present cold and stormy weather hold much longer. At Butte City, Montana, the great mining center of the Territory, the mines and mills have all been closed down, being unable to obtain salt, fuel or other needed supplies. In consequence of this movement, 3500 men have been thrown out of employment.

Operations on many other mines in the Territory have for the same reason been suspended, or because the plant upon them has been buried up or carried away by snowslides, which have also in numerous instances proved destructive to human life. These avalanches, though not peculiar to these mid-continent regions, occur in the mountainous districts there with great frequency and violence, many lives being lost and much property destroyed by them every winter.

Although the snow falls to as great a depth in the Sierra Nevada of California as in the Rockies, and the former is quite as steep as the latter, still, few snowslides, none of great magnitude, ever occur in the Sierra Nevada, the heavy growth of timber there tending to check these movements of the snow. The timber on the Rockies being comparatively sparse and scrubby, is incapable of resisting the weight of the snow; hence the greater frequency and force of these movements there. As the forests on the Wasatch Range, of Utah, as well as on most of the higher mountains of Idaho and Colorado, are even more scattered and stunted than on the Rockies, snowslides there are very common. As their occurrence can be neither foreseen, prevented nor guarded against, they constitute a great drawback to the business of mining in the localities where they happen to be extensive or frequent. In California they are rarely ever attended with fatal results, and cause but little harm, the most of our mines being located in the foothills of the Sierra Nevada or elsewhere, far beyond their reach.

It is calculated that one-half of all the cattle in Montana have already been frozen or starved to death and that many more will die before the winter is over. In Colorado and Western Nebraska the destruction of stock seems to have been equally great, the terrible snowstorm that occurred in that region on the 19th inst. literally covering the cattle up. At last accounts, immense herds were to be seen with only their heads above the snow, tens of thousands of animals having already buried out of sight. Such was the force of the wind that cars, and even engines, were blown from the track. The tempest, usually confined to the mountains, on this occasion swept down upon the plains, and, tearing up the dry sand and intermixing it with the snow, drove the mingled mass along with a fury that neither man nor beast could resist. In Mon-

tsna, as also in Oregon, Washington and Idaho, there is apt to blow in the winter a warm, west wind, called the "chinook," which melts the snow so rapidly that the most of it disappears, except on the mountains, in the course of a few days. But this winter the "chinook" having delayed its coming, the snow, which in Montana commenced falling about the first of November, has since gone on steadily accumulating, till it has reached a great depth even in the valleys, from some of which it will not probably disappear for weeks to come. If winters like this are going to become the rule in these countries lying contiguous to the great continental backbone, we shall have to substitute them for Greenland in making future comparisons of cold.

Lieutenant Schwatka, he of North Pole notoriety, has, it would appear, been hibernating in Montana the present winter. Emboldened by his experience in high latitudes, this intrepid person formed the plan last autumn of going out to the Yellowstone National Park with a view to noting the winter aspect of that interesting locality, and doing perhaps a little mountain climbing by way of pastime. Alas! poor man, he had, it would seem, in preparing for this desperate undertaking, sadly miscalculated the meteorological conditions that some times obtain of a winter in this Yellowstone region—thought, presumably, that he would have to encounter there no greater cold than that in which the Icander or the Esquimaux swelter of a December night. Acting under this misapprehension the Arctic explorer provided himself, it may be supposed, with only a half dozen buffalo robes and a single bale of Mackinaw blankets. With this scanty outfit what could he do but keep close to his hotel, as the Montana editors accuse him of doing, and for the which they berate him soundly; insisting that instead of keeping within doors he should have plunged into snowdrifts and exposed himself to be buried under an avalanche or blown away by a cyclone! It is all very well for the civilian to argue that a person assigned to a service like that ought to consult duty and fame rather than safety and comfort. There, will, however, always be a difference of opinion as to how far a man should feel constrained to imperil his life for the good of science or expose himself to be converted into an icicle for the sake of glory.

For our own part, we only wonder that the man, escaping from his miserable and perilous surroundings, did not at once make his way to California, putting a thousand miles or two between himself and the scene of so many dangers and discomforts. It is, in fact, matter of astonishment that the well-to-do people of these snow-blockaded, tempest-swept countries do not all make their escape and come over here, at least once a year, and get thawed out. Commiserating their situation, we have time and again counseled them to adopt this sensible course, picturing in our poor way the mildness of our winters and the general excellence of our climate as a means of inducing them to come here and sojourn for the winter—have told them of our snowless valleys and our coast region with its perpetual spring—of this land where the blizzard is never let loose, where the lightning never strikes and little ice is ever seen except in the mountains; where, as an appreciative and poetic writer puts it, "The orange and the lemon grow to perfection and the daffodil and the lily bloom all the year round." We don't see that we can do anything more for that unfortunate people than we have done.

As for mine investors, they must see by this time that California is the country in which to embark their money in that business. The thoroughfares connecting points of supply with the principal mining districts are here never obstructed by snow. The ditches that bring water into the mines rarely ever freeze up; never do they remain frozen for more than a week or so at a time. Extensive snowslides occur but seldom, and, as before remarked, are confined to localities where they can do little or no harm. Not often have they proved destructive of property or fatal to life in California; not often have mills and hoisting works, with their occupants, been slid down the mountain-side and buried up under a hundred feet of snow, there to remain till the following spring. The expense of rebuilding these works, as also the extra wages men exact for being exposed to these accidents, are all avoided here. The many other advantages pertaining to California as a

mining country we will not at this time attempt to enumerate, the purpose of the present writing being to merely speak of those incident to our superior climate, with its freedom from hurricanes and its mild and open winters.

Legislative.

The Boiler Inspector bill has been fully discussed, but was finally so loaded down with amendments that it was referred to the Committee on Labor and Capital. It will hardly be possible to get it back on the file in time for passage this session.

The Act to protect life and property against the careless and malicious use or handling of high explosives has passed the Senate as amended. This bill practically throws the burden of protecting people on to the manufacturers and agents instead of upon the police departments.

Goucher's bill relating to trade-marks and how rights thereunder may be protected has been ordered to a third reading.

The Senate bill relating to the regulation of plumbing and drainage, and to the registration of plumbers, has been read the third time.

The Senate has passed the bill appropriating \$46,250 for the erection of new buildings at San Quentin.

In the Assembly, on Wednesday last, the bill appropriating \$60,000 for the support of the State Mining Bureau was amended, on Brierly's motion, so as to provide that at least 50 per cent of the money shall be spent for geological work in the field. An amendment by Smyth to reduce the appropriation to \$20,000 was voted down. The bill was ordered engrossed, and to the third reading. It is to be hoped it will be now passed. The institution needs support, and a pittance to simply maintain it, without giving its officers enough to work with, will be of no benefit. Some of the suggestions concerning further reduction of the appropriation were absurd.

On Wednesday, Walrath tried to have taken up his debris-impounding dam measure, but was unsuccessful.

In reporting favorably to the Assembly the bill providing for the erection of debris dams, the Committee on Water Rights and Drainage added:

We are constrained to do this from a sense that this bill proposes a feasible plan for the satisfactory settlement of a great sectional contest that has been going on for the past eight years between the valley residents along the banks of the Sacramento, Feather and Yuba and Bear rivers and the miners who dump above them in the hills and mountain canyons of the Sierras, and which contest, without any appreciable benefit to the dwellers in the valleys, has resulted only in disaster and destruction to the mining industry. An immense amount of property, aggregating in value many millions of dollars, has practically been confiscated through the application by the courts to this sectional controversy of legal principles that had their origin in another land, and under physical conditions that have no parallel in this country. Without compensation having been made, the valuable property of the miner has, in fact, been taken for private ends. The lawful industry of a lifetime has been impossible of pursuit, and the oppressed miner is at our doors asking not that he may be permitted to destroy his neighbor's property, but that some means may be devised whereby, without injury to that neighbor, he may be permitted, at his own cost and expense, to resume that occupation which stimulated the founding of this State, which has nourished its growth, and whose continuance is so essential to her future prosperity.

The bill under discussion answers, in our opinion, all these requirements, and if it can be enacted into a law, we believe that the miner may not only resume his labors without injury to his brother of the plains, but that the result of the construction of proper impounding dams will be to hold in the river channels of the mountain gorges the immense deposits of debris which have been there accumulating for over 30 years.

That the scheme of this bill is feasible, and that the mining debris may be impounded, was clearly shown to us in committee by the written testimony of such eminent engineers as Wm. Ham. Hall, L. J. Le Count, Prof. George Davidson, A. W. Von Schmidt, A. J. Bowie, Jr., Geo. F. Allard, Thos. Price, F. Van Leicht, A. Boschke, G. H. Specht, E. J. Molera, H. Jennings, Melville Atwood, George E. Gray, Milo Hoadley, J. R. Manran, Constantius Heusch, Calvin Brown, Marsden Manson, L. L. Robinson, and the publicly printed opinion of Colonel Geo. H. Mendell, Hamilton Smith, Jr., Wm. Ashburner, Gen. B. S. Alexander and Captain J. B. Eads; and therefore, believing upon the faith of such eminent authority, especially in view of the immense interests involved, that its plan is worthy of trial, we report this bill back with the recommendation that the substitute be enacted into a law.

Working Gold Ores.

A Novel Process Adopted in Calaveras County.

The property of the Willard Mining Co. in Murphys District, Calaveras county, is rather a curious one in several respects. The mine itself is worked differently from what quartz mines generally are, and the working of the ore is conducted in an unusual manner. There is a main vein and several small side veins. The ore carries absolutely no pyrites, which is found in considerable quantities in every other gold-bearing vein in that section, outside of this particular belt of veins. For a depth of 300 feet in some cases, from the surface, the vein is decomposed and disintegrated so it bears resemblance to a gravel bank, though the quartz is all sharp. This decomposition has broken the quartz up into pieces from many tons weight down to fine sand. The mine is worked by an open cut from the surface, making a funnel-shaped hole, connected by a chute with a tunnel below, through which all the material mined is run out. The tunnel is wide enough to allow a track, flume, water pipe and air pipe to run all the way in. At the end of the tunnel is a chamber, connected with the workings above by a short chute. At the bottom of this chute is a large gate; below the gate is a grizzly, and a platform and a small bin for loading into a car. The flume which runs through the tunnel comes in under the grizzly, and the water pipe connects with a small tank at the head of the flume.

With 150 to 300 pounds of low-grade powder they dislodge from 3000 to 4000 tons of material, which is thrown down to the bottom of the pit and into the chute. It is then drawn off as fast as wanted by means of the gate. As it comes through it passes on to a grizzly with bars set five inches apart. The coarser material thus screened goes on to the platform, into the bin, and thence to the car and is run out. What goes through the grizzly drops into a hopper below, from which it is fed into the flume.

The superintendent, Mr. F. B. Morse, is to be credited with devising many new plans in connection with this enterprise. As the method of working the ore is novel, we give it in his own language, reserving for another occasion a description of the works at the mine. Before commencing the description of the process for working the ore, it will be well to call the attention of mining men to the cheapness of the process; and, moreover, it will be well to note how the silver-plated amalgam plates do their work of saving gold, and how much is saved in that part of the process. No doubt a similar arrangement might be adopted at other mines with profit. An engraving is given of this plate-house, so the arrangement can be understood.

The flume under the hopper in the tunnel is 14 inches wide and 18 inches deep. It has a grade of 5 inches in 12 feet, and we run about 130 inches of water in it. This water carries all the material that comes into the flume out of the tunnel and dumps it into a dump-box.

The dump-box is a large double-compartment box, each compartment being 35 feet by 12, and 9 feet in the clear. It is provided with a large movable "tom-iron" and two hydraulic nozzles working under 90 feet pressure. The mine is worked on the day shift only, the quartz and dirt being run into one compartment of the box. The dump-box is run on the night shift, when the material that comes in by day is thoroughly washed free from clay, and is then run into another set of sluices, which convey the quartz direct to the mills.

At the mills the quartz-sand and dirty water are passed over a long grizzly of perforated screens. The quartz drops from this directly into the ore bin, and the sand and dirty water passes through the screens and is dropped into another flume. As the quartz goes into the mills it is also separated automatically as to size, the finer part going to the stamp mill and the coarser to the concentrating mill. The waste water and sand that goes through the grizzlies is taken by the flume below to what is called the "plate-house," where it is distributed over silvered plates.

We mine on week days only, running the mills every day. In every working day we mine about 300 tons of material. Of this about 10 per cent is run out on cars, and 90 per cent comes out in the flumes. This material is largely clay and sand, too fine to pay for further crushing. Three hundred tons of this dirt will produce 95 tons of milling quartz. This loose material—the sand and clay—all carries a considerable amount of fine loose gold, varying in size from the finer float gold up to particles the

size of the head of a pin—we never find any coarser than this. This gold we save in the sluices and plate-house. For this purpose we have the following arrangement of flumes, etc.: The flume from the chamber to the dump-box is 800 feet in length; grade, 5 inches in 12 feet; width, 14 inches, and is lined with block-rifles the entire way. The flume from the dump-box to the mills is 300 feet long; grade, 6 inches in 12 feet; width, 24 inches, and is also lined with block-rifles. From the mills to the plate-house the flume is 300 feet long; grade, 6 inches in 12 feet; width, 24 inches, and is lined with slat-rifles. These various flumes pick up about all the visible gold, so that the material that goes into the plate-house is apparently nothing but sand and dirty water.

In the plate-house this sand and water is divided into six equal parts, dropped into distributing boxes, and run over six aprons. These aprons are 20 feet long by nine feet wide, with a grade of five inches in the 20 feet of length. Near the lower end each apron is covered with an apron of silvered plates, nine feet square; below the silvered plates is a riffle filled with mercury, to catch loose amalgam; and below the aprons is a tank into which everything drops, to catch the loose mercury. All the water and sand is run over these aprons, each carrying about 20 inches of water. These aprons save the float gold that has escaped the sluices, and sometimes give astonishing results.

the same time have a largely increased capacity over a fine screen.

The coarse rock and all the sulphur-bearing rock goes to the concentrating mill. This mill is constructed on a different principle from most mills of the sort, as we use Tustin pulverizers instead of stamps for crushing the quartz. The ore first goes through a 12-inch Blake rock-breaker and then drops into the ore bin, from which it is fed to the Tustin pulverizers. These pulverizers are provided with automatic self-feeders, the same as we use in the stamp mill, and they feed the same way. We crush wet and amalgamated on aprons, after which the pulp is concentrated on Frue vanners.

We run four pulverizers. These run at 20 revolutions a minute, requiring 4-horse power each. We crush through a 20-mesh steel-wire screen, the capacity of each machine being from 10 to 11 tons a day on the kind of rock that comes to it. The aprons are silvered plates, 4 feet wide by 10 feet long; grade, 1 1/2 inches to the foot. We use 8 Frue vanners—2 to each pulverizer. Our coarse rock carries a very small per cent of sulphurets, from 1-16 to 1/4 of 1 per cent. The sulphurets, however, are very high grade, some being worth, when pure, upward of \$5000 a ton. We concentrate our rock up to from 82 to 88 per cent of the assay value, according to this kind and grade of the rock.

A comparison of the two methods of crushing

Altitude, feet.....	2200
Number of stamps.....	15
Weight of stamp, in pounds.....	750
Drop of stamps, in inches.....	6-8
Drop of stamps, per minute.....	96
Duty of stamps in 24 hours, tons crushed.....	2 6-10
Size of screens, slot No.....	5
Number of Tustin mills.....	4
Revolution of Tustin mill, per minute.....	20
Duty of Tustin in 24 hours, tons crushed.....	10-11
Size of screen in Tustin mesh.....	20
Miner's inches of water used in 24 hours in stamp mill.....	50
Miner's inches of water used in 24 hours in Tustin mills.....	100
Miner's inches of water used in 24 hours in mine.....	150
Pressure of water in stamp mill, in feet.....	140
Pressure of water in Tustin mill, in feet.....	160
Cost of mining, per ton.....	50 cents
Cost of milling, per ton.....	60 cents
Number of concentrators.....	8
Percentage of sulphurets.....	1/4
Number of men in mine.....	12
Number of men in mill.....	7
Total number of men employed.....	21

New Mines in Ventura County.

While Southern California has of late been making rapid strides in the direction of agricultural and horticultural progress, and has been building up rapidly in every way, it has also been doing something in the way of mining. A number of the camps have been enlivened by the advent of Eastern capital, and there is more mining going on in Southern California than ever before. The place which is just now attracting the most attention is the camp in Ventura county, now called "The Carbonate Camp." It is in the eastern section of the county. A new town has been laid out, called Lexington, which covers an area of 560 acres, and has been laid out in blocks and lots. The lots are selling at \$10 and \$15 now in the new town.

Following are directions how to get to the new carbonate camp of Lexington: From Buena Ventura it is distant 135 miles as follows: Fifty-five miles to Newhall, 40 miles to Elizabeth Lake, 20 miles to Gorman Station, 10 miles to J. F. Cuddy's and another 10 miles to Lexington. It is 120 miles from San Luis Obispo, 60 miles to Bakersfield, 140 miles from Santa Maria, 150 miles from Santa Barbara, 120 miles from Calico and 125 miles from Los Angeles. The nearest railway station is at Lancaster, 50 miles distant.

A number of new ledges of apparent richness have been found. The immediate necessity of the camp is a good ore-reducing plant. There are mines in the vicinity which will furnish plenty of ore. It is expected that the camp will be very lively in the spring.

Foundry Notes.

The Union Iron Works have completed large new boilers for the Pacific Mail steamship Colima. The steamer will shortly be taken off the Panama line and be thoroughly overhauled and repaired at the shipyard of the Union Iron Works.

The Government Inspector, who is to oversee the building of the cruiser Charleston at the Union Iron Works, has arrived in this city. The foundations upon which the ship is to be constructed are being laid.

The great dome for the Lick Observatory at the Union Iron Works is approaching completion.

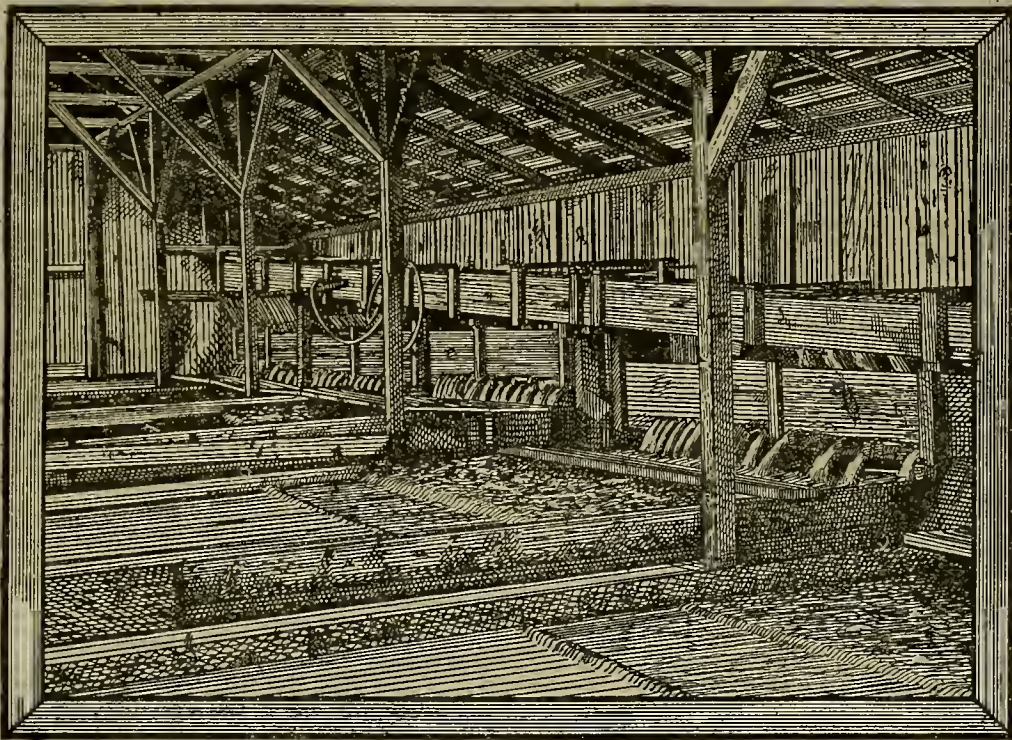
Most of the local foundries now have some special quartz-crushing appliance which they manufacture and introduce. Of course they all make the ordinary stamp mills as well.

The Pacific Rolling Mills are employing a good many men on general work.

The Pacific Iron Works are about introducing a new boiler in the market, which has many advantageous features and has been well received in the East.

The Risdon Iron Works did a good thing when they began to introduce the Heine boiler, many of them now being in use here and giving great satisfaction.

There are more men at work in the Tombstone, A. T., mines at the present time than there has been for the past two years.



ARRANGEMENT OF PLATES FOR CATCHING GOLD AT WILLARD MINE.

We have cleaned up as high as 160 ounces of amalgam from them in a week. This gold is of the finest possible sort, and the amalgam has absolutely no grit, and is apparently almost a homogeneous mass of hardened mercury. The water, after leaving these plates, goes to waste, the plate-house being the last gold-saving apparatus we employ.

At present we are working only the main vein. A great amount of work, however, has been done on the side veins, and a number of promising bodies of high-grade ore have been developed. These side-vein ore bodies vary in length from 70 to 500 feet or more; the veins average in thickness from two to eight feet, and the walls are hard and firm. A large amount of ore has been taken from them near the surface and worked, and we are now preparing to open and work them at a depth.

We are running two mills—a stamp mill and a concentrating mill. The stamp mill is an ordinary mill of that sort. It contains 15 stamps, in 3 batteries of 5 each, with self-feeders, ore bins and plates. We work all the fine part of the quartz here, so no rock-breaker is required; and as the fine quartz carries little or no mineral, we have no concentrators here.

The stamps weigh 750 pounds each, work under a 6-inch to 8-inch drop, and drop 96 times a minute. We crush through a No. 5 slot screen, and crush 2.6 tons to the stamp in 24 hours.

We amalgamate entirely outside. For this purpose we have silver-plated aprons below the mortars, each apron being 4 feet 4 inches wide and 12 feet 6 inches long, with a grade of 1 1/2 inches to the foot. Below the aprons we have 12 feet of spout plates to catch apron, 18 inches wide by 12 feet long; grade 1/2 of an inch to the foot. The free gold in our rock, especially in the finer rock, is very fine flour gold. It is worth \$18.50 an ounce, yet an ounce of dry, hard amalgam will only retort about one-fifth gold. We have experimented with crushing through every size screen from No. 9 down to No. 4, and we find that although our gold is so very fine, yet we save the most per ton in crushing coarse through a No. 5 screen, and at

shows a marked difference in results. In crushing through the battery a large amount of slimes are produced. With the pulverizer a very small quantity of slimes is made. As a consequence, with our ore, where the rock is very hard, the gold exceedingly fine, and the sulphurets soft and brittle, we find that on the same ore we amalgamate a much greater percentage of the fine gold after the pulverizers than after the stamps; and when we come to concentrate, we can save only 18 to 20 per cent of the assay value of the ore after stamps, and 85 per cent after the pulverizers. On the same ore and with same screen our pulverizer is about the equivalent of 6 to 8 stamps, according to the character of the ore.

Our sulphurets we work ourselves, by roasting and chlorination. Our roasting works consist of two Willard furnaces, with all necessary appurtenances. These furnaces are of a ton capacity each to the charge, and we can roast, if necessary, from 6 to 8 tons a day. The chlorination works are of equal capacity, consisting of 11 pairs of leaching and settling tanks, with generators, etc. We roast the sulphurets, granulate them, and run them in a car to the chlorination works. After which, they are treated in the usual manner, and the gold leached and precipitated.

We run entirely by water-power. We use 130 inches in the mine. In the stamp mill we use, for power and amalgamation, 80 inches, under 140-foot head. In the concentrating mill we use for power, amalgamating and concentrating, 100 inches, under 160-foot head.

The cost of mining is about 50 cents per ton of quartz, delivered at mill. The average cost of milling in the two mills is about 60 cents a ton.

We employ 12 men altogether about the mine, including men in the open cut at the chamber and dump-box and carmen. In the mills we employ seven men, and at the chlorination works two men, making a total of 21 men on an average. We are now putting up compressor, etc., for power drills, and propose soon to open up various veins at a depth. The following details are of interest:

MECHANICAL PROGRESS.

Babbitt Metal.

Every mill, says *Wood-Worker*, ought to possess some rig for melting babbitt metal. In many shops the boiler furnaces is the only place available, and a 20-pound ladle the only utensil to be had. The inconvenience of this method is easily told. The ladle is shoved into the furnace as far as its four-foot handle will allow it to go, a brickbat placed under the handle, and the furnace door closed until it strikes the handle.

As the melting progresses the handle gets hot, and an attempt to remove the ladle generally spills part of the metal. In carrying this ladle with its red-hot handle, more trouble is met with, and if the workman doesn't drop the whole business because of a badly burned hand, then we may consider ourselves lucky. When a blacksmith's forge is available, the heating question is simplified, but if any welding of iron is to be done, then don't beat babbitt metal in your forge fire. A little lead in the fire, and you cannot weld until the fire is all cleaned out, either by burning salt therein, or by removing the coal altogether and substituting new.

The better way to melt babbitt metal is to get a common iron kettle, or pot, such as are used in the kitchen. The thicker the metal, the better. Set the pot on a few bricks laid in the road or the boiler-room floor, and build a fire of sticks under the pot; the whole fire need not be bigger than your hat, and half a dozen pieces of board one inch square will be enough under the pot at one time.

Keep an inch depth of ashes or dirt on top of the babbitt and very little metal will be lost by oxidation. The usual practice in melting babbitt metal, or lead, is to skim off all dross as fast as it collects, and this is a very poor method at best.

Oxygen of the atmosphere acts very fast upon melted metal, and the hotter the metal, the faster the oxygen will combine with it to form the oxide or dross.

By excluding the air, and its oxygen with it, the production of dross is completely stopped, whether accomplished by dirt on the metal, ashes, or by other means.

A very clean method is to cut out a piece of sheet iron just large enough to go in the pot easily. Let this float on the babbitt, and it will do the business thoroughly. After the metal is melted, the pot may be carried bodily to the place where babbitting is to be done. The ladle can be placed in the metal until hot, then the babbitt can be dipped up and poured when desired. By this method many a box can be saved which is lost by running short of babbitt, either through a leak around the babbitting arbor, or by not melting enough metal to begin with.

A man is pretty apt to "say his little verse" when he runs short of babbitt in filling a box; and when he must needs chip out that otherwise perfect lining, his moral standing is apt to be sadly lowered.

Twenty pounds of metal in a kettle can be more readily brought to the right temperature, and kept there, than can two or four pounds in a ladle. Pour babbitt metal too hot, and it is apt to be loose in the box, especially if the box be solid. The general rule in pouring babbitt is to beat it just hot enough so that it will brown, not burn, a clean white pine stick; but if the box be large, and is to receive a lining of considerable thickness, the metal should be poured as cold as it will run. In case of a thin lining from one-eighth to three-sixteenths of an inch, the metal will have to be poured much hotter than the above standard, or it will not fill the space. Such thin linings should be discouraged wherever possible, and no lining ought to be less than one-fourth of an inch in thickness.

ECONOMY IN STEEL MANUFACTURE.—The close competition in steel rails renders it necessary for English iron-workers to make use of every possible economy in the purchase of the raw material and in the methods of manufacture. In Wales the managers of some of the works are preparing to roll lengths of 150 feet instead of 90 feet, the longest rails made at present. This will give fine rails, and necessarily lessen the cost of production. Certain of the tin-plate makers are also aiming at economies by the purchase of steel blooms instead of buying as before tin bars exclusively. The price of blooms is somewhat under that of bars, and consumers can easily roll them down into bar form in their old forge trains.

AMERICAN STEEL is the best in the world. American steel-makers understand their business, and the metal they manipulate as well, if not better, than the steel-makers of any other country. It is but a little while since the whole world went to Pittsburg to study the best mode of manufacturing heavy ordnance and to examine into the American methods of ironwork in general. They learned some important lessons and honestly admitted the fact. America is rapidly coming to the front in every class of manufacture. Why not?

CAMPOR FOR DRILLING HARD STEEL.—A correspondent of the *Scientific American* writes to that journal as follows: Having occasion to drill through a very hard piece of steel, I tried a saturated solution of camphor (alcohol and

gum camphor), and the result was marvelous, the drill apparently "biting" its way through the steel. Thinking your readers might be profited by a knowledge of this feature in drilling, I offer this same for trial, with the hope that those using it may be as well satisfied with the results as your subscriber has been.

Nomenclature of Iron and Steel.

Pig iron is melted direct from the ore in the furnace, and contains from 3 to 5 per cent of carbon. When melted it is called "cast iron" or "metal."

Spiegel iron is precisely the same, but contains in addition from 5 to 15 per cent of manganese.

Bar iron, often called wrought iron, is pig iron which has been smelted and deprived of nearly all its carbon, either in a puddling furnace or by the Wallon, Lancashire or other analogous processes; the spongy mass or ball of iron is usually hammered or rolled into a bar.

Puddled steel is precisely the same as "bar iron," except that the process of puddling is stopped when rather more than half of the carbon has been removed from the pig iron. There are consequently no hard and fast lines between bar iron and puddled steel, the one intergrading to the other by imperceptible degrees. Although there are an infinite number of intermediate stages between the softest bar iron and the hardest puddled steel, and although it is impossible to state the exact percentage of carbon which marks the dividing line between the one and the other, it is usual to call all puddled bars which cannot be hardened in water, bar iron, and all those which can, puddled steel. This dividing line falls somewhere near a mixture containing $\frac{1}{2}$ per cent of carbon.

Blister steel is bar iron which has been converted into steel in a converting furnace, and varies in the amount of carbon which it contains from $\frac{1}{2}$ to $1\frac{1}{2}$ per cent.

Bar steel is blister steel which has been tilted or rolled down to the size required.

Cast steel is steel that has been melted in a "pot" and poured into a "mold," thus becoming an "ingot," which is afterward hammered or rolled to the size required. It may be of various "temper," varying in percentage of carbon which they contain from $\frac{1}{2}$ or less to $1\frac{1}{2}$ or more.

BOILERS AND STEAM PIPES.—STREET STEAM-PIPE EXPLOSIONS.—Are steam pipes to be regarded as boilers or "continuous boilers"? This novel question is being raised by property-owners in New York City, who are fighting the New York Steam Company, as to whether the big steam pipes in Broadway and elsewhere are not virtually boilers, and as such should be inspected by the police department. The boilers of the company are located on Greenwich street, and, of course, have been duly inspected. The pipes have not been examined, however, as it is a question which only the courts can decide, whether the steam pipes should be regarded as continuous boilers. There is certainly a steam pressure in them. It is stated that 264 explosions have occurred in the pipes, and that three lives have been lost. The company attributes the explosions to the accumulation of illuminating gases. The decision of this question is looked forward to with considerable interest.

TEMPERING STEEL.—When we were much younger than we are now, says a correspondent of the *Boston Journal of Commerce*, and the clearing on top of our head hadn't acquired such beautiful proportions, we had to temper up a lot—yes, verily, many lots—of steel tools, and here's the "great secret" we used: We got a "slush bucket" and washed it out clean, then weighed out one ounce corrosive sublimate, put in two handfuls common salt and stirred it up with two gallons rain-water, heated the tools in hot lead, and hardened in this liquid and drew over a charcoal fire. A tool never broke.

WELDING BY ELECTRICITY promises to become a more useful discovery than was at first supposed possible. It is well known that by the ordinary method of heating and hammering, only soft iron, steel and a few other metals have been welded; but by the use of electricity not only have cast iron, brass, gun metal, bronze, German silver, zinc, tin, lead, and many other metals been welded like to like, but it has been found in many cases very easy to unite unlike metals. Small pieces, too, which were formerly difficult to weld on account of rapid cooling, are easily dealt with by the new process.

STEEL SHEETS FOR GALVANIZING.—The galvanizers are experimenting with steel sheets in place of iron, but they are met with the difficulty that all qualities of steel are not equally applicable to the process. It has not yet been ascertained what thickness steel sheets will take to give coating, and it is still a matter of question as to whether the cause of variability is to be found in the difference of composition or of surface.

IMPROVED ORDNANCE.—Thomas Jessup & Sons, of Sheffield, it is said, have devised a new gun so constructed as to prevent erosion. The matter is attracting considerable attention in government circles. But one gun has thus far been constructed, with which the government is experimenting. Should the Admiralty report favorably upon it, the gun will be immediately manufactured in large numbers.

SCIENTIFIC PROGRESS.

Sources of Power.

In the older treatises on mechanics, we find the sources of power classified under the heads "Wind," "Water," "Steam," "Animals," and, broadly speaking, these are still the only sources of power we possess. But when we deal more in detail with the subject, we find that wind, in all probability, owes its capacity for performing work to the sun, while water is absolutely inert save as actuated by gravity, and steam is, of course, merely an agent by which heat is converted into work. Concerning the methods by which animals perform work, we are entirely ignorant, no physiologist having as yet succeeded in tracing the sequence of processes by which food is converted into mechanical energy. Enough is known, however, to show that the process has nothing in common with that by which work is performed by heat engines. So that the analogy sometimes drawn between a man and a machine must be rejected as far-fetched, permissible to the poet, indeed, but not to the philosopher. Furthermore, it is known that the work got out of food by men and animals is much greater on the whole than can be obtained from fuel consumed in the best steam engines. That is to say, a man or a horse may be more economical sources of energy, in one sense, than any machine. As this as it may, it is sufficiently evident that we depend for the performance of all the work done in the world on two main sources of power—heat and vital energy. The action of gravity, it is true, causes the falling of water, and so gives out power; but the water has to be raised before it can fall, and this raising is effected by the heat of the sun.

It appears to be not unreasonable that men should ask themselves, now and then, if there are no other sources from which power may be derived—is there no other force of nature that can be made the slave of man? The question has been put in hundreds of ways, and remains unanswered. The seekers after motive power have been nearly as numerous and persistent as those who wasted their lives in search of the philosopher's stone. With the "perpetual-motion" man we have no patience, and it is, perhaps, scarcely necessary to point out to our readers that we are about to speak of something very different indeed from the ordinary notion of perpetual motion. Inventors who have sought that, have for the most part attempted to get something out of nothing—that is, in a word, create energy. There is a wide difference, however—a great gulf, indeed—between this and an attempt to still further explore nature's secrets in search of a source of energy—that is to say, of work—now unavailable. Now, in dealing with this question of sources of energy, it seems to be not impossible that a misapprehension of the nature and bearing of the laws of the conservation of energy may do a great deal of harm.

It may be said, for example, that it is quite useless to search for a source of energy which can be better or more economical than what we have now, and much more to the same effect. But let us ask ourselves what is this law of the conservation of energy, on what is it based, and what would be the consequences to the universe if it did not exist? Such questions are very seldom asked, because the number of men who are at the pains to think for themselves is small; but when they are asked, the answer is remarkable. There is really no reason at all why energy should be conserved, and so far as our senses supply evidence, far from being conserved it is being profusely wasted every day. Of course, if we go a little behind the evidence of our senses, we find that the waste is only apparent, not real. It is much easier, however, to form an idea of a universe in which the law of the conservation of energy has no existence, than it is to realize a fourth dimension in space, or even the life of the inhabitants of Flatland. As a help to the realization of such a universe, we may point to the fact that the sun has been giving out energy for millions of years, and that there is no reason to think that he has lost any portion of his original heat. In other words, it is simply impossible to prove that what we call energy is not created in the sun. Again, let us take gravity. We have here the most stupendous force in nature. There is no reason to imagine that it is capable of degradation. If all the planets fell into the sun, gravity would of necessity have performed an enormous amount of work; but no one can say that after it was done gravity would be any the weaker. It may, indeed, be said that the law of the conservation of energy has only just missed being disproved, if the words "conservation of energy" be used in one sense. So far as can be seen there is no reason why the line of magnetic force should not behave like lines of electrical force or heat force, and admit of being intercepted or stopped. It would then suffice to put a permanent magnet under one end of the beam, the other end of which should be connected in the usual way with a crank and fly-wheel. Then, by interposing and withdrawing a thin intercepting plate at the proper intervals, we should have a machine which would work steadily until it was worn out, without the expenditure of one farthing for fuel. In the popular sense of the word, we should create power; and the perpetual-motion men would spend their lives in patenting details, while the principle would be public property.—*Selected.*

Dry Rot in Timber.

In a recent number of a German technical paper, Herr Gottstater treats of the question of dry rot by the light of a summary of known facts illustrative of the subject. He is of opinion that this problem is still to be solved; and, in view of the occurrences of dry rot under some very peculiar conditions, suggests that the germs of the disease may exist in the living tree. In no other way can he explain the decay of wood from this cause when it was apparently dry and sound and properly used. In Russia there are entire forests from which no timber is now taken, experience having shown that it has always been attacked by dry rot. Sometimes a strong solution of common salt, applied while hot, has been found an efficient preservative of timber. The necessity of airing timber in its built-in position is, of course, universally recognized. Professor Farsky, of Tarbor, Bohemia, has found that salicylic acid is a preventives and cure for dry rot. At first the acid was used in a dry form, but latterly great success has been achieved with a solution of 5.28 ounces of salicylic acid in 0.22 gallon of alcohol, and afterward diluted. This solution has efficiently protected a floor 800 square feet in area from the spread of dry rot, and has removed it from the spots where it seemed to have established itself. The crude acid may be used for this purpose, and its action as an antiseptic is heightened by the admixture of a little carbolic acid. Professor Poleck finds that wood cut in winter and not soaked in water is very susceptible to dry rot, which does not appear when the timber is kept perfectly dry or thoroughly wet. A somewhat high temperature and dampness are almost, though not entirely, essential to the propagation of the dry-rot mycelia. It is in contemplation to determine by experiment whether timber cut in summer cannot be rendered safe against dry rot by the removal of the bark, protracted drying and prolonged steeping in water.

THE POWER OF STEAM.—IMPORTANT BUT DANGEROUS EXPERIMENTS.—The early experiments for the purpose of measuring the force of vapor of water were very important and dangerous. In the early days of the use of steam it was very important that such experiments should be made, because the safe working of steam engines was dependent upon correct measurements of the force, and because all the properties of heat had to be passed in review; and dangerous, because they "imposed the task of confronting the unknown caprices of a formidable force. There were but two men," says *Science*, "to accept it and conduct it to success—Arago, who never shrank from a duty; and Dulong, already maimed by an explosion, whose previous studies had admirably prepared him for the new work." A rude monometer was extemporized, and a boiler, far less staunch than the steam boilers of to-day, was set up, in which water was heated until the water was 27 atmospheres. "They could go no further. At this extreme point it leaked at all the joints, and the steam escaped through the fissures with a hissing that was of bad omen. But the observers, though aware of the danger, silent and resigned, finished without accident the measurements which they had begun." Telling M. Jamin's story, which was written out as above from his dictation, Arago said: "Only one being of our company preserved his serenity and slept quietly; it was Dulong's dog; they called him Omicron."

A SUBMARINE CRATER.—Recent observations are said to indicate the existence of a submarine volcanic crater between the Canary Islands and the coast of Portugal. From a cable-laying steamer in 39° 25' north, 9° 54' west, the water was found to measure 1300 fathoms under the bow and 800 fathoms under the stern, showing the ship to be over the edge of a deep depression in the ocean bottom. It is well known that great inequalities are found in the bed of the Sea of Lisbon, and these are thought to be due to a submarine chain of mountains.

BLASTING WITHOUT EXPLOSIVES.—A new method has been recently introduced by Dr. Kosman, and is described in the 87th volume of the *Institution of Civil Engineers*, page 41. Zinc powder and sulphuric acid are contained in a glass cartridge, by breaking which the two substances are brought into contact and hydrogen is rapidly evolved. A pressure of about 37,000 atmospheres is obtained, although, perhaps, with hardly sufficient rapidity to justify the use of the term "explosion."

A NEW MODE OF LIGHTING.—A new mode of lighting is on trial at the Marlborough rooms, and the experiment seems to be successful. A small gas flame has an ordinary lamp-glass over it, and over this is suspended a small muslin skirt, impregnated with incombustible oxides. The gas flame lays hold of these, and the result is an enormous increase of the illuminating power of the flame. The light is white and smokeless.

NATURAL GAS.—It is said that practical experiments made by good gas engineers have proven that natural gas cannot be conveyed in pipes over 35 miles. If such is the case, cities and towns at a much greater distance than that from its natural sources cannot hope to benefit by the discovery of this cheap and wonderful natural product. The city and works must go to the gas, for the gas cannot come to the city.

ENGINEERING NOTES.

CONNECTING THE GREAT LAKES WITH THE MISSISSIPPI.—The project for a steamboat connection as above has long been under consideration by engineers and by Congress. The trouble seems to be to select some one of the several routes proposed. Reference to the various routes is made in the following extract from an Illinois journal, which evidently favors the Hennepin canal: "The Board of Army Engineers, appointed under the provisions of the last River and Harbor bill to examine into the feasibility of the work, finds that the proposed canal is feasible, and because of its commercial importance is worthy to be undertaken by the General Government. But it recommends the non-acceptance by the United States of the Illinois canal under the provisions of the existing act of the Illinois Legislature. This means that a recession would be necessary by the people of Illinois, and this would take the subject out of Congress for the next three or four years. The board also, by its indorsement of the Marais d'Osier or northern route, as against the Rock Island or southern route, puts a damper on many friends of Hennepin. Most of the engineers who have made surveys have favored the Marais d'Osier route, but Gen. John Newton, when at the head of the Engineer Corps, always overruled his subordinate and upheld the Rock Island route because of its superior commercial advantages. But he is no longer with the department, and the Marais d'Osier people have their own way. The Hennepin canal scheme is not dead; it will live again, and we believe, will at no very remote day become an actual realization."

A GIANTIC PROJECT—THE FUTURE OF WESTERN ASIA.—The French have started another canal idea that throws the Suez and Panama quite into the shade. The project is due to M. Ende, who proposes to cut a canal through Syria and Persia, and thereby unite the Mediterranean with the Persian Gulf. A portion of the Orontea would be canalized. Syria, Persia, and the Asiatic provinces directly to the east of Persia are evidently destined to become areas of large and industrious populations. Industries will be rapidly introduced there as soon as Europeans gain a sufficiently secure foothold to crush out the present effete governments. The principal hindrance to such a movement just now is the difficulties involved in properly parceling out the region among the various European governments. Russia is evidently intent on securing the lion's share, and she will get it. This was in all probability the early oracle of the human race, and probably it will be about the last to come under subjection to modern industrial rule. When it reaches such a destiny, it will prove the garden of the world.

THE PERECOP CANAL.—Russia seems to be very active in her various internal improvement schemes—especially along her eastern European frontier; evidently having an idea of the possible early need of such improvements for war purposes. Late accounts are to the effect that the Government has concluded an arrangement with the firm of H. Hersent & Co., of Paris, for the raising of a sum of 25,000,000 roubles, gold, in order to construct the Perecop canal, in the Crimea. The canal will establish a direct route between the Don, the Black sea and the Sea of Azof, and three lines of rail, namely, the Kiossoff-Voronej, the Kursk-Charkoff, Azof, Don or Mariopol line, and the Losoff-Sebastopol, Charkoff-Nicolaieff line will be brought into junction with it. The strategical importance of the canal will be considerable, but it will also enable the Russians to bring the coal and coke of the Don collieries to the Black sea ports and undersell the English coal, which at present enjoys almost a monopoly in those ports and at Constantinople.

MORE ELEVATED RAILROADS FOR NEW YORK.—Mr. Field proposes to girdle the city of New York with elevated railroads, thus connecting the river front on either side with the Battery. To complete the system he would induce the ferry companies to add an upper deck to their boats, so that the passengers may be transferred without touching the pavements. All the railway companies controlling ferries favor the project. The new cable road in 125th street sends the cars through noiselessly at the rate of eight miles an hour, and officers of the Third-Avenue railroad are so favorably impressed that the adoption of the cable system on this road is probable. The road connects at Tenth avenue with the section that runs to High Bridge. The electric motor for Third Avenue is pronounced entirely practicable.

THE RECENT RAILWAY-BRAKE TESTS.—One of the interesting subjects touched upon during the recent railway-brake tests at Burlington, Ia., was the question of the value of slack in coupling cars as a help in starting, the use of loose coupling, of course, allowing the engine to start each car separately in rapid succession. The results of the experiment, however, were not in favor of this, though they showed the beneficial effect of some slight elasticity in the coupling.

A NEW INCANDESCENT LAMP.—An incandescent lamp which requires no vacuum in the globe is said to have been invented in Germany. The wire used is a mixture of conducting and non-conducting elements, the latter preventing the former from melting.

USEFUL INFORMATION.

A New Method of Cleaning Stonework.

It is sometimes required to clean the surface of old masonry that has become weathered or coated by deposits from dirty water, either for the sake of appearance or to make a sound connection with new work. The only effectual method hitherto practiced has been by completely redressing the surface with the chisel—a tedious and costly method. A different and, it is claimed, a more satisfactory process, has been devised by M. De Leilhhabert, which was recently used for cleaning the walls of the quays at Paris. These walls in a few years become covered with a shiny, black deposit, which resists acids. To remove it, a paste composed of a solution of soda and lime, to which a little chloride of lime is added, was mixed to the consistency of honey and spread over the surface, where it was allowed to remain for two or three hours, according to the condition of the stone. When it was removed the deposit was still black; but it had become sensitive to acids. After this preliminary treatment a workman passed over the surface (with a large gutta-percha brush) a mixture called sulphochlorhydric, forming on the stone a kind of glue; and almost immediately afterward he syringed the surface with a jet of the same liquid. It formed an adherent paste, continuing to act upon the stone for about two or three hours. After the syringing came a gang of men who scrubbed the surface, finishing off with a hose-pipe. The sulphochlorhydric mixture is composed of sulphuric and hydrochloric acids mixed empirically according to the nature of the stone and the necessities of the case. The cost of cleaning stone walls by this method in Paris is .46 franc per square meter for material and .50 franc for labor, by contract. The preliminary treatment by the caustic paste was paid for separately at .50 franc per square meter. It is said that the stone itself is not damaged by this treatment, and soon regains its natural color.

HOW THE RUBBER ROLLS ARE FASTENED ON THE CLOTHES-WRINGER.—First, clean the shaft thoroughly between the shoulders or washers, where the rubber goes on. 2. Give the shaft a coat of copal varnish between the shoulders, and let it dry. 3. Give shaft coat of varnish, and wind shaft tightly as possible with five-ply jute twine at once, while varnish is green, and let it dry for about six hours. 4. Give shaft over the twine a coat of rubber cement, and let it dry for about six hours. 5. Give shaft over the twine a second coat of rubber cement, and let it dry for about six hours. 6. Remove washer on the short end of shaft, also the cog-wheel, if the shaft has cogs on both ends. 7. See that the rubber rolls are always longer than the space between the washers where the rubber goes on, as they shrink or take up a little in putting on the shaft. 8. Clean out the hole or inside of roll with benzine, using a small brush or swab. 9. Put the thimble or pointer on the end of shaft that the washer has been removed from, and give shaft over the twine and thimble another coat of cement, and stand same upright in a vise. 10. Give the inside or hole of roll a coat of cement with a small rod or stick. 11. Pull or force the roll on the shaft as quickly as possible with a jerk, then rivet the washer on with a cold chisel. 12. Let roll stand and get dry for two or three days before using same. Cement for use should be so thick that it will run freely; if it gets too thick, thin it with benzine or naphtha.

RESTORING PLUSH.—It is customary to use ammonia for the purpose of neutralizing acids that have accidentally or otherwise destroyed the color of fabrics. This must be applied immediately or the color is usually imperfectly restored. After careful use an application of chloroform will bring out the colors as bright as ever. Plush goods and all articles dyed with aniline colors, faded from exposure to light, will look as bright as ever after sponging with chloroform. The commercial chloroform will answer the purpose just as well. This chloroform will be found very useful, as chloroform, which is quite cheap, readily restores the color of faded plush garments.

HOW TO BRIGHTEN PICTURE FRAMES.—Picture frames will often look as though they needed regilding, when all that is necessary to improve their appearance is, to apply with a soft brush a mixture of white of eggs, two ounces, and one ounce of chloride. King's yellow and Indian yellow, if shadowed with burnt amber and gamboge, produce a very good imitation of gilt. Defaced gilding, if the result of the dust adhering to the surface, will look bright and new by being coated with wet fuller's earth, and on this drying it should receive a coating of ox-gall with a sponge.

WOODEN BOLTS in house-building, and their superiority over nails, is thus commented upon by an English journal: "Why do you make so lavish a use of nails in the carpenter work of our houses, to the exclusion of the honest, old oaken pin? Pull down any building, if it be merely a barn, more than 200 years old, and you will not find a single nail in the original work; rafters and joints were all bolted together so stoutly as almost to defy the tools of the destroyer. Many an old manor barn,

when pulled down of late years—as, unfortunately, only too many of them are—has shown itself to have been better built than most palaces are now. There are arguments in the way of economy of time, and an on, in favor of the use of nails in house-building; but they are as nothing compared with the solid advantages of using wooden bolts. The iron nails in time canker and rot rafters and floors, but wooden bolts hold them together 'like grim death,' and render a house practically indestructible."

OILING CYLINDERS.—Two cylinders have recently come under the notice of the Boston *Journal of Commerce*, one which had run 18 years and another 15 years, the first without any lubrication and the second with only a little attention in this respect once a week. Both cylinders were polished like a mirror and neither was appreciably out of true. The condition of these cylinders after so long a run leads one to question the necessity or advisability of pouring so much oil through engines as is frequently, it may almost be said, usually done. It appears that a cylinder can be so made and the piston so packed as to run without it, without especial injury to itself in a long term of years, but it is probable that the diminution of friction which would accrue from the use of oil would more than balance the expense and troubles of its use. There is no doubt, however, that there is an immense amount of oil used needlessly in this way, and it appears to be the very general testimony of those who have tried it that a cylinder which has run well without lubrication, if once oiled will always require it.

TO KEEP LEMONS.—Lemons are a very cheap luxury for those living near cities, or having easy access to rapid transportation, and can be kept fresh for months by putting them into a clean-tight jar or cask, and covering them with cold water. Keep in a cool place out of reach of sunlight, and change the water often—not less than every third day, every second day is better. Lemons are excellent for winter use, or if one is bilious or inclined to rheumatism.

IVORY MAY BE CLEANED by scrubbing with a new soft tooth-brush, soap and tepid water, then dry the ivory and brush well, dip the latter in alcohol and polish the ivory until it has regained its former sheen. If the water gives the ivory a yellowish tint, dry the object in a heated place. If age has yellowed it, place the object under a bell-jar with a small vessel containing lime and muriatic acid; and set the whole in the sunshine.

TO KEEP postage stamps in the pocket or memorandum book without sticking, a New Orleans postoffice clerk advises people to rub the sticky side over the hair two or three times. The oil of the hair coats the mucilage and prevents it from sticking.

You can make your own "gas fitters'" cement thusly: Melt up $4\frac{1}{2}$ pounds rosin, 1 pound beeswax, and stir in 3 pounds Venetian red; it will hold gas in.

GOOD HEALTH.

Diet for the Aged.

Dr. H. C. Wood, in the *Annals of Hygiene*, gives the following: The teeth in old age are, of course, lost, and they should, unless under exceptional circumstances, be replaced by artificial teeth, for the thorough chewing of food is even more necessary in the old than in the young, because in the old the digestive powers are apt to fail. With the best artificial teeth mastication is apt to be imperfectly performed, hence the food of the aged should be soft and readily comminuted, and especially should it be of easy digestion. Very few old people need stimulating diet; very many are injured by an excess of nitrogenous food. The kidneys, like all other organs, are feeble, and if meats and other rich foods are used in excess, they greatly increase the strain upon these organs. Milk and milk products, or preparations of bread-stuffs cooked with milk, should form a large proportion of the food of the ordinary aged person, but individual peculiarities differ so much that personal medical counsel should in all cases be taken, so that the diet may be regulated to the needs of the individual case. Very many old people are hurt by the use of food in excessive quantity; but little exercise can be taken, all growth has ceased, and the bodily furnace which makes heat are able to destroy but very little of food fuel.

Some little time since I had occasion to lecture on this subject at the Philadelphia hospital, and an assertion that I then made that most old people are more comfortable, enjoy better health, and probably live longer for the use of wine, has met with very severe disapprobation at the hands of some of the profession, whose strong sympathy with the temperance movement dominates their judgment. No valid reasons have, however, so far as my judgment goes, been brought forward to lead me to change my opinion. In the overfed American people the habitual use of wine during youthful or middle age and vigorous health, we think, an injury rather than a good; but when the powers of life are failing, when digestion is weak, and the multitudinous small ills of feebleness perplex and annoy, one or two glasses of generous wine at dinner aid digestion, quiet for the

time being much nervous irritation, and in no way do harm. The sum total of ruin wrought by alcohol in the world is appalling, but it is not lessened by shutting our eyes to the good that wine, properly used, may achieve. When in the aged there is a distinct failure of vital power, and especially of digestive power, the call for the habitual use of alcoholic liquors is, in my opinion, imperative. The danger of the formation of any evil habits when a man has crossed the line of 70 is so slight that the most conscientious physician need not hesitate in recommending the daily use of alcoholic beverages to his patient.

A Cure For Consumption.

A novel method of treating patients suffering from phthisis is described in a recent number of the *Medical Record*. It was devised by a French physician, Dr. Bergson, of Lyons, who has been applying it for two years to cases of chronic pulmonary and throat disease. The results are said to be remarkable. In acute general phthisis there has been an arrest of the progress of the disease and a cure in a few months. In advanced consumption marked improvement of symptoms is rapidly secured, night-sweats ceasing and the cough becoming less harassing. Two hundred cases have been treated with singular success by Dr. Bergson in Lyons, where the climate is unfavorable for consumptives. His method has been introduced in the hospitals there and in Paris, and the medical authorities are favorably impressed with it.

The treatment consists of daily injections by means of medicated gases. Carbonic acid gas when introduced into the system by this method is found to be painless and harmless. Sulphurated hydrogen is mingled with it, the entire structure of the lungs is permeated by the medicated gas, and remarkable curative effects are observed. The carbonic acid gas is practically inert when taken up by the veins of the intestines, but the sulphurous gas reaches every particle of diseased tissue in the lungs and throat, which is eliminated from the system in the process of expiration. The volume of gas used is very large. At the outset a single litre is introduced, but the quantity is rapidly increased to 10 or 12 litres for each injection.

The results of this new system of treating consumption are so well vouched for that we commend the subject to the critical examination of medical circles in this country. Consumption is the chief scourge of the Atlantic seaboard. Any departure in therapeutics so radical as this French method deserves to be thoroughly investigated and adequately tested in American hospitals. Dr. Bergson is not a scientist, but a reputable physician of large practice and good standing. If his method be as effective and successful as he asserts, it merits general attention from the profession in the United States.—*New York Tribune*.

VINEGAR AND INDIGESTION.—It is the business of the saliva to digest starch, and by its alkalinity to stimulate the secretion of the gastric juice in the stomach. It is well known that the saliva is unable to act upon starch in the presence of an acid. Experiments have shown that even so small a quantity of vinegar as one part in 5000 appreciably diminishes the action of saliva upon starch. One part in 1000 renders it very slow, and twice the latter quantity arrests it altogether. From this it is evident that vinegar, pickles, salads, and other preparations in which vinegar is used, are unwholesome, especially when taken with farinaceous food, such as bread and other grain preparations. There is a popular notion that by the use of vinegar a tendency to increase in flesh may be antagonized. The physiological fact that fat is largely formed from the starchy elements of grain and vegetables, rather supports the popular notion; but this method of reducing weight should not be encouraged, as the loss of flesh is secured at the expense of good digestion.—*Good Health*.

PIMPLES.—Hearty eaters are more subject to pimples, especially on the face, than those who are somewhat abstemious in their diet. Persons who are troubled with pimples should eat simply to satisfy the wants of the body, but avoid anything like gluttony. Select good food and put aside articles that will disturb or retard digestion. Greasy, oily substances, an excess of sugar or butter, and coffee or tea have a tendency to interfere with the action of the stomach and intestines, and clog the blood with matter that cannot be disposed of readily by excretory apparatus. Keep the skin clean, too, by frequent bathing. For the removal of pimples, there is nothing better than a solution of salicylate of soda—a teaspoonful of the powder dissolved in a three-ounce vial of water. Use as a lotion; it is the best preparation to secure a beautiful, healthy skin which can be used, and the cheapest.

A CURIOUS AFFECTION.—The Berlin Medical Society has received a report by Mons. Lawin, describing an affection that seems to be peculiar to workers in silver. It appears in the form of round or oval spots of a bluish hue on the skin, which may reach the size of a five-cent nickel. They are generally on the back of the left hand, and can only be accounted for by supposing that the silver in solution falls upon scratches, where the body fluids give rise to some chemical change producing the peculiar color.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. *Amador Ledger*, Feb. 19: The pipe for the Wildman is all completed except tarring. The iron work for the hoisting works is being placed on the ground very fast, and the building over the hoisting works is nearly finished. The Mahoney mine is running to its full capacity. It takes only a dozen men to run the whole business at mine and mill. J. Lyzinsky and Mr. Callaghan are up from the city, looking after matters pertaining to the Mahoney.

NEW SUPERINTENDENT.—*Amador Ledger*, Feb. 12: Mr. Dolan has been sent up from San Francisco to take charge of the Gold Mountain mine, at Quartz mountain, in place of Mr. Jackson, the former superintendent. The mill is running steadily, and all who are acquainted with the property express the utmost confidence in its paying character, if wisely handled. Mr. Graham, one of the bondholders, is still on the ground. M. M. Culbert's new ten-stamp mill at Lower Rancheria has started up since the late heavy rains set in. The machinery for the new mill to be erected on the Goodman mine, at Quartz mountain, has been ordered from San Francisco.

Butte.

SPRING VALLEY.—*Oroville Mercury*, Feb. 16: Superintendent Glass of the Spring Valley mine was in town this morning, and when asked if there were any further developments of the legal status of the company, informed us that the Bank of California and the company have agreed that the mine shall resume operations under the present management, and that the laborers at the mine shall have all the profits until their claims have been liquidated. This means simply that the financial difficulty has been obviated, and that the old Spring Valley mine will go on washing out gold as heretofore. We are glad to know that all is well with the mine again.

Calaveras.

MURPHYS.—*Calaveras Prospect*, Feb. 19: In this vicinity mines and mining were never in a healthier condition. The Oro Plata pulverizers are running on ore stoped with the Burleighs from the Red Wing. Its 15-stamp mill is at present shut down, on account of the difficulty and danger attending working in the big pit from which the ore is extracted. This danger will be over as soon as fair weather sets in. Lem Johnson and John Canyon are working the Collier mine in Collierville, and are taking out ore that mills \$600 per ton. This vicinity invites the prospector. The old Taylor mine, a few miles distant from this place, is being worked by James and Hiram Taylor. Some five years ago a five-stamp mill was erected on this property, and rich rock taken from the top of the lode. The present owners are running a tunnel to tap the lode at a considerable depth. They are now in 150 feet and expect to strike the lode 20 feet further on.

El Dorado.

AT NEWTOWN.—Cor. *Placerville Republican*, Feb. 19: The mines here in early days were very rich, and we believe there are places yet when thoroughly prospected that will develop into paying claims. A company from San Francisco has recently commenced a tunnel on Mr. Snow's place, which, when completed, will open a channel which there is every reason to believe is rich. There are quite a number of tunnel claims that are worked summer and winter. The most noticeable of these is one owned by V. Tachino and J. Gardella, being run to the distance of 600 feet, on the north side of what is known as the Newtown Hill. Also one adjoining owned by G. Paginini. C. P. Steadman & Son own a ditch supplied with water from the south branch of Webber creek, and which furnishes water for irrigation and mining purposes. They also own a hydraulic claim which has been successfully worked for several winters. Quartz mining has not received as much attention here as it should have. There are several ledges in which gold has been found, but they have never been opened. There was a mill put on the ledge known as the Utah, a few years ago, and run for a short time, but owing to bad management, it was closed down. The mill stands, and we hope and believe the mine will some time be thoroughly tested and prove good.

Fresno.

HILDRETH MINES.—*Fine Gold Miner*, Feb. 18: Russ Fleming has located a fine prospect. The ledge is well defined and of good milling quality; the surface croppings assay \$30 per ton; the selvedge upon the foot and hanging walls are talc, porphyry and some loose quartz, that by pan test (20 pounds of dirt) prospects \$45 to the pan. In the vicinity of Fleming's find are four or five valuable ledges owned by Fresno and Hildreth mining men. Undoubtedly from the amount of gold in quartz float in that section other ledges will be found that will be equally as good as Fleming's. The Morrow mine is showing up well. Since Jesse's return from Fresno city he has put a force of men to work in the upper tunnel, and from the prospects obtained of the last two or three tons it is thought that they have got into another "pay chute" of ore, although the ore is no better than the lower tunnel contains. The ore dump is increasing, and we understand that Jesse will lease the Hanover mill shortly. From the favorable condition for working the ledge and the amount of ore in sight they can keep the mill running day and night for the next six months. The Taylor and Fraser mine is improving wonderfully upon development. While sinking a working shaft upon four feet of ledge matter that prospects \$30 per ton, what was supposed to be the footwall upon drilling through turned out to be the hanging-wall of the ledge proper, showing 3½ feet of fine milling quartz that assays \$70 per ton—making in all (ledge matter on the hanging-wall and quartz) nearly 7½ feet. The people around are quite jubilant over the new discovery. The Fresno mine, owned by Messrs Hitchcock, Keith and Bird, is looking fine and without a doubt is the making of a good mine in the future upon proper development being made. Since writing of the Zoller and Johnson prospect in the last issue, a rich pay chute has been opened up, and upon visiting and examining the ledge we find that the report

was not exaggerated. Like the majority of ledges in the district, it is small, being 1¼ feet between the walls but very rich; the smaller the vein the richer the ore is in coarse gold. Below water level the sulphurets in this mineral belt average between \$275 and \$600 per ton. On account of this late discovery the surface ground for half a mile has been located for extensions. Fred. Nobleck is one of the lucky owners of the Rough and Ready mine, and we understand that he has also bonded ¼ more from Capt. J. T. Young for \$3000. The development of this property is a 100-foot shaft, or rather incline, from the bottom of which a crosscut and drift has been opened up that is about 45 feet in length. This was done in order to find the pay chute. The entire development is on a two-foot ledge that mills \$85 per ton coarse gold. The sulphurets are worth \$600 per ton. The Cascade mine, the mother lode of the district, is coming to the front in great shape since F. C. Sculley, of San Francisco, has taken an interest in the property. In drifting in the tunnel, a fine ledge was opened up that is very rich. The tunnel will drain the working shaft 120 feet. The Baker Bros. are also owners in this property, and state that a mill will either be put on the Cascade or Rough and Ready this coming summer. Norman Jennings' new discovery and location is another rich surface prospect which only remains to be opened up and developed to ascertain its true value. Such rich croppings do not, as a general rule, continue in this section 75 feet before running into sulphurets three parts, and one part coarse gold. The specimens we broke off the apex will, undoubtedly, assay \$10,000 per ton. The ledge three feet below the surface, between walls, is 12 inches with another foot of ledge matter that prospects 50 cents to the pan. The James & Francis Mining Co. is sinking and drifting on its rich ore body, and at the present rate it will not take long to sink 200 feet deeper. The ledge is strong, the hanging-wall being a micaceous sandstone and porphyry, and the footwall talc. The Patterson ledge is the extension of the Wilson mine, and judging from the ore on the dump lately brought to the surface when examining the lode, the Patterson is a good mining proposition. The ledge is two feet between walls, one foot of the vein being very rich. On account of developing another location nothing was done in the Louis Wilson mine, except astraining four tons of the ore which netted \$70 per ton. Mr. Wilson has also contributed a fine large specimen for exhibition at Los Angeles. The Dahlonega quartz mine, owned by Geo. W. Grayson, Jr., Morris Gladdis and Nicholson, is, in fact, the real "blue streak" mine, and at its present depth, and on account of the valuable ledges which surround it, makes it worth fully \$25,000. The ledge proper is two feet of solid quartz that mills \$40 a ton with sulphurets that assay \$350 per ton, while the three feet of ledge matter on the hanging-wall mills \$25 a ton. The owners are sinking, but from the flow of water in the pump will soon have to put in a pump. A 20-stamp custom mill in this district would be kept busy all the year round.

Nevada.

COLUMBIA HILL.—Cor. *Nevada Transcript*, Feb. 19: In the *Transcript* of February 12th, we saw a few brief notes upon the quartz interest of this section, but they gave a very faint idea of the extent of this quartz belt. Of course the Delhi and Grant quartz mines head the list, as they are permanent mines of intrinsic value, and will sooner or later boom the whole network of gold-bearing quartz veins extending along the Middle Yuba river from the Grant mine to the McKillohan mine, a distance of 25 or 30 miles. Already many trees between these two points are adorned with location notices. Many of these locations have but an imaginary value, but those on Grizzly ridge, from which good prospects have already been obtained, come in the following order: First comes the Grant, then come the Sip, the Gardner, the Egyptian King, the Egyptian Queen, the Old Bucklin, the Southern Extension of the Delhi, the Delhi (already a dividend-paying mine), the Last Chance, the Kampfer and the Josephine. This part of Nevada county affords an opportunity for the quartz miner and also an opportunity for the farmer.

WATER.—*Nevada Transcript*, Feb. 22: A good head of water is running in the Snow mountain ditch, and all the mines on Deer creek just below this city have an abundant supply. They are running regularly as usual with the exception of the Wyoming, where everything is ready to start up at a moment's notice. Supt. Buffington went to San Francisco last week, and the men do not like to start the machinery till he returns, or sends orders for them to go ahead.

Placer.

A QUARTZ MILL.—*Placer Republican*, Feb. 16: The owners of the Drummond quartz mine have decided to put up a quartz mill on their property in the spring. The mine has been prospecting splendidly, and has proved to be as rich as any one could wish. It is situated about three-quarters of a mile west of Cottage Home on Brimstone Plains, and was discovered last October, by J. P. Drummond. It is owned by Mr. Drummond, C. F. Hoffman, William Jones, John Liddell, and J. B. Hobson. There are two ledges on the claim, one of which averages three feet in width with a coarse northwest and southeast. This ledge prospects from \$10 to \$20 a ton. The smaller ledge runs east and west, and is about a foot thick. Three cubic feet from the croppings of the latter ledge have panned out \$600 in a hand mortar. A shaft has been sunk in the footwall to a depth of 40 feet where it was found that the vein pitched off to the south, but the rock continues to be rich. The present storm has probably stopped prospecting for the present, but the coming summer will see this mine in shape and a fine property.

RISING SUN.—Owing to legal complications in which the Rising Sun mine at Colfax is involved, it is unlikely that any work will be done there before next fall.

MAYFLOWER.—But very little work is being done at the Mayflower tunnel just now, owing to a lack of fuel. One pump is kept going.

Plumas.

THE MINING SEASON.—*Greenview Bulletin*, Feb. 16: The last two weeks have materially brightened the mining outlook in Plumas. There has been an enormous fall of snow, thus insuring a good water season. All around are indications of greater activity in mining circles next summer. There will be am-

ple water in the Round Valley reservoir to operate all mills depending on it for power. The Green Mountain is said to be doing well; the Crescent shaft is going down rapidly with scarcely a doubt of development of a rich property; the Drury mine, which has been paying beyond the expectations of its owner, will be operated more extensively, and it is probable that work will be resumed at the Cherokee. A much greater quantity of work will be done in the Genesee section, while on the North Fork there will be quite a boom in drift mining. Numerous small operations will also be pushed with vigor. We, therefore, are assured of a much better mining season.

CRESCENT.—Work in the Crescent mine is progressing quite favorably. Good headway is being made in the shaft. It is gratifying that the Crescent Co. is determined to sink to quite a depth. It is scarcely possible that they should fail in developing a large body of ore as rich as that which made Crescent boom in days gone by. Work at this mine is conducted upon business principles. "Pay as we go" is a motto which the owners seem perfectly willing and able to live up to. The Green Mountain is pursuing the even tenor of its way. We are so accustomed to this regularity, under the able management of Supt. Rodgers, that we take but little note of it. We understand that a much superior body of ore has been reached. Mr. Bradford, the secretary of the company, came out from New York several days ago, and is now at the mine, snowbound.

San Benito.

OIL.—*Hollister Free Lance*, Feb. 18: Messrs. Charles Bronson and Frank Dintick, the latter a mining expert and the representative of large capital in San Francisco, the former also largely interested in the success of the present oil venture, went up to the Vallecitos valley this week, to give a careful examination of the works there as at present established, and to report upon the prospects. The oil well is at present down over 100 feet. It is about eight inches in diameter. A number of gentlemen interested in the project will arrive from San Francisco Saturday or Monday, and will proceed at once to the works. The indications at present are most favorable.

Shasta.

NUGGET.—*Democrat*, Feb. 16: A nugget weighing two ounces was picked up on Clover creek last week. C. E. De Forrest is having another arastra built, which will doubly increase the reduction capacity of his plant. Another furnace is being erected at the Redding Reduction Works and the plant increased to double capacity. The railroad company has promised to put in a side track for the works. The Paul 12-stamp circular battery at the Calumet mill is a grand practical success, so say all the quartz miners who have seen it at work. The company has ordered the second battery. The Redding Reduction Works have turned out so successful already that the company has decided to double the working capacity of the furnace, work on which has already commenced. Tons of ore is shipped to the works, and so great is the demand to have ore worked that Supt. Chick was compelled to restrict shipments. Jake Overmyer, W. A. Albertson and others recently located ground in the vicinity of Furnaceville that prospects "way up," and are thinking of building a mill there shortly. The mines at Furnaceville, those that have heretofore been worked, are known to be rich, but the ore is so base that several failures were made, but experiments will go on till some process will be discovered by which those rich base ores can be reduced successfully. Of late years several very promising mines have been discovered, the ore of which is free milling, which will be developed and worked. This will create renewed confidence in the camp. There is joy in French gulch over the prospects of lively times in the future caused by the developments made in the Lower tunnel, better known as the O'Neal tunnel, of the famous Niagara mine, owned by W. T. Coleman. At 1100 feet a rich body of ore has been struck, four feet in width, and reports say that there is enough in sight to last for years to come. Already an iron track is being laid to run the ore direct from mine to mill. Tom Greene is also improving on his former success, and Martin Jones, on the divide, is well pleased with his prospects in the old Mudrock mine.

A RICH MINE.—*Redding Free Press*, Feb. 12: Since S. P. Fillman has purchased a half interest in the Texas and Georgia mine from Mr. Day, thereby removing some financial obstacles to success, Dame Fortune seems to have smiled her sweetest smile upon them. A week ago Mr. Fillman introduced mercury on the plates specially prepared by Mr. Chick of the reduction works. The effect seemed to be a great saving of gold, for, in a five days' run, they cleaned up \$1000 in bullion. Of course, this yield made the owners happy, but there is still better luck to chronicle, for, besides the rich rock taken from the stope, the foreman miner, while penetrating a 14-foot ledge in the main tunnel, came across a large body of exceedingly rich rock, and he claims that it is the richest mine in Shasta county. Since the change in the management, an ore-feeder, rock-breaker and new plates have been added which are not yet in running order, but soon will be, when large results may be anticipated. The other mines of the Old Diggings district are also turning out well, especially the one bonded by Hopping, Bell & Co. to Riley & Co. for \$35,000.

Sierra.

A MILL NOTE.—*Tribune*, Feb. 18: The Sierra Batters folks have closed down their mill at No. 6 tunnel for the winter. The lower 60-stamp mill is pounding away regularly on bullion-producing ore.

OUR PROSPECTS.—When the snow disappears there will be busy times around this camp. Never in the history of Sierra city have there been such evidences of future prosperity for our people and town as there are at present. It is safe to assert that ere another year rolls round enough new and profitable mining enterprises will be inaugurated in this vicinity to make it the most talked of and liveliest district in the country. This camp is only yet in its infancy, but it is enjoying a good substantial growth that will eventually land it at the top of the heap.

THE PHOENIX MINE.—Up at the Phoenix mine all outside work has been suspended owing to perverse elements. In underground, however, some barmy miners are at work with hammer, drill and powder putting through an upraise. The vein has been exposed in the lower tunnel for a distance of

something like 250 feet. Taken throughout, the quartz yields excellent prospects, and the heaviest stockholders in San Francisco, together with A. C. Busch at this place, are fully satisfied with the mine as far as the developments have progressed.

CLOSED DOWN.—*Mountain Messenger*, Feb. 19: Young America has been closed for the past 10 days on account of the storm and deep snow.

NUGGET.—The story that a nugget weighing 5000 ounces was found near Dowville, at any time, is not founded on fact. The largest piece of gold ever found in this vicinity weighed 96 pounds, and was sold to Woodward, of San Francisco, for \$22,000.

Trinity.

DEADWOOD.—Cor. *Trinity Journal*, Feb. 19: Joseph Falan is doing active prospecting on the Vermont property, having leased various portions to different parties who appear to be well satisfied over the outlook. Mr. George Kline is actively engaged in both extracting and milling ore, and appears quite contented over the results. Mr. Wm. Lappin has again put in an appearance on Deadwood and intends opening up in good style at the opening of spring; an abundance of good milling ore is in sight and further developments may yet prove its extensiveness and value. Van Matre Brothers are still taking out good ore, and Reynolds & Co., of the Rising Sun mine, are taking out very rich rock from a fair-sized ledge. George Chenoweth, on the Black Bear property, made a new discovery some few months ago and at present has several men employed extracting ore that will go into the hundreds. Some damage was done to the Huntington mill, erected some time ago on the Dead-draught mill, by the shed falling down in consequence of the recent heavy snow. The Sulphure Reduction Works, near the mouth of South Fork, has proved to be a grand success, good and creditable work being done. All the older mines are prospering as usual, that is to say, we have no direct complaints, and everything appears to move on as smoothly as a trade dollar. Most all the arastras are in operation. Yes, sir; next spring we expect to blossom out like the rose with prosperity and advance still further the quartz interests of our ever-glorious camp. The present heavy storms rushing down the side of our mountains will give the prospector a chance to discover, and the many small mines and prospects which bear the emblem of future prosperity will be pushed ahead by Deadwood's industrious bands.

NEVADA.

Beveridge District.

ACTIVE.—*Walker Lake Bulletin*, Feb. 16: Beveridge district is becoming active, a large sale is in prospect, and the indications are that there will be a rush to that camp within a few months.

Esmeralda District.

TO RESUME.—*Esmeralda News*, Feb. 10: Arrangements are being perfected by the New Esmeralda company to resume operations on an extensive scale, and thoroughly prospect their extensive mining property in Aurora district. Strong hopes are still entertained that Aurora will again be a booming camp. The Silver Lining is reported as working along with the usual number of men and that it is showing considerable improvement. A connection is being made between the tunnel and the upper level. Quite a large body of ore is now in sight, and it is believed that when the connection is completed this mine will become a bullion-producer.

Gold Mountain District.

PROSPECTORS.—*Walker Lake Bulletin*, Feb. 16: The Gold Mountain prospectors are all feeling well. There will be heavy work done in that country within the next year.

Hawthorne District.

THE BEST DISTRICT.—*Walker Lake Bulletin*, Feb. 16: Nevada is richer in minerals than any other State. It will be truly conceded that Esmeralda county has no rival in variety and extent of mineral wealth, and in this county, Hawthorne district will soon lead, as the best district. The oldest and most experienced mining men admit that they never saw a district so richly endowed or so curiously varied as to the character of its ore. In every direction, mineral belts extend, some large, some small, all, however, promising well, and nearly every one with a distinct character of rock. The continued discoveries of rich ore make it a certainty that this district will some day be the greatest bullion-producer in the State. Should water not be found within a reasonable distance from the mines, the great value of the developments will finally induce men of means to bring some far-off stream to the district, and then nearly every claim in an area of many square miles will be valuable. "Time will tell," so everybody says, and the ancient mower will not be much older before he opens his mouth and proclaims the wealth of Hawthorne district.

Kinkead District.

MOSS MILL.—*Walker Lake Bulletin*, Feb. 16: The Moss mill at Kinkead resumed work yesterday, and Kinkead is again a live camp. The mill begins on ore from the Toronto, which was taken out by John Warner and Alex. Morrison on a lease. This ore is rich in free gold, and will give a good start to the renewal of operations. Kinkead is the district of rich rock, and there will be considerable activity there this year. The Toronto has a fair supply of rich rock in sight, the Montreal is liable at any time to again show a body of the wonderfully rich quartz which made the reputation of the district, and a new claim has been opened which will of itself make the district lively. The Warner, recently located by John Warner, is a large ledge of good rock about two miles from the mill. The ore deposit is extensive and easily mined. There are now many tons of rock ready for the mill, which will be worked as soon as the ore from the Toronto lease is finished. The Regulator, a claim owned by Moss & Warner, will also be worked this year. This claim has a good ledge of fair average, and will furnish a large quantity of rock for the mill. All the difficulties have been settled and the mill will probably keep sending out bullion from now on without interruption.

Tuscarora District.

BELLE ISLE.—*Times-Review*, Feb. 16: Line crosscut, 150-foot level, has been extended 8 feet; total length, 71 feet. Drift north from this crosscut has been advanced 11 feet. The vein matter is

about 20 inches wide, but does not assay anything of value.

TORNADO CON.—Extended west crosscut 3 feet in very hard quartz; total length 40 feet. Encountered in same, 20 feet in, a six-inch streak of promising quartz giving low assays in silver. The face of crosscut is again in promising stringers which will bring us on another pay streak within a very few feet. Unable to get supplies to the mine, we are forced to suspend work for a short time.

NAVAJO.—Have started a drift south from line crosscut east, 150-foot level. Fair progress is being made with all other work in and about the mine.

NORTH BELLE ISLE.—Gangway north on the 400-foot level has been extended 18 feet. The ventilation has been materially improved the past week by changing the current of air back of the upraise, into a line of air-boxes, that has been carried to the face of the drift. Fair progress has been made in extending the drifts north on the 150 and 70-foot levels. Repairs and other work have been forwarded as usual the past week. Will close down to-morrow to clean boiler.

NEVADA QUEEN.—Resumed work in north gangway 300-foot level. Gangway on the 200-foot level has been extended 18 feet. In the crosscut from the gangway to the shaft on this level, several sets of timbers have been put in during the week. The shaft has been sunk 10 feet. The flow of water continues to increase. Little or no progress has been made the past two days.

ARIZONA.

STOCKTON HILL.—Cor. Mohave Miner, Feb. 19: For a month past mining business has been at a standstill as far as the shipments of ore are concerned, although the C. O. D. has sent down to the sampling works at Kingman a couple of carloads of ore sorted out from the proceeds of the mine in December. But it must not be inferred from this that the mines are giving out, or that the ore bodies have disappeared, but, on the contrary, it should be made public that our two prominent mines, the C. O. D. and the Cupel, have both been putting in new hoisting machinery, and making other improvements necessary to the safe and economical working of the mines. In addition to the erection of hoisting works, the owners of the C. O. D. mine have just finished the building of a road from Wallapai valley direct to the mine, which has been done at a considerable cost, some say as much as four or five thousand dollars. Steam was gotten up last week, and the work of sinking the main shaft, already down 215 feet, continued, and it is reported by those working in the shaft that the ore body improves with every foot. This is fully borne out by the amount of ore coming to the surface. On the Cupel mine, the hoisting works, which are a duplicate of those on the C. O. D., have been put in position and are now working to perfection. After passing some 30 feet of barren matter at the water level, a vein of ruby and native silver ore, some two feet wide, was struck, which assays from a three-ton sample, nearly \$400 per ton, and as depth is attained the ore seems to improve, so that competent experts estimate the ore taken out in the past two or three days to be fully worth \$1000 per ton. The two mines mentioned are the first of the Mohave county mines to prospect below the water level in proper and business-like shape. That each of them, in one month's work out of sinking of a shaft alone, will make money enough over and above the ordinary running expenses of the mine, to pay the cost of the hoisting machinery, is the best argument your correspondent can advance to prove the fact that the mineral wealth of Mohave county's mines lies below the water level.

DIFFERENT DISTRICTS.—Prescott Courier, Feb. 15: Frank Kuhne, of Walker district, told us, yesterday, that miners are hard at work and very hopeful, now that sampling, and, maybe, reduction works, will soon be set up in Prescott. Mr. Rowe has big piles of ore on dumps at the Davis mine, Col. Bigelow, Dave Grubb, and other mine-owners of Hassayampa district, will send in plenty of ore to the sampler. We have very good news from Peck district. Mr. Dawes is running his mill, and his air compressor is doing good work. Want of wood has been the main cause for having kept the mill idle, but now he has a supply and will make constant shipments of silver. The Nevada mine, Groom Creek, the Reach & Mulvenon Turkey Creek, are yielding very rich rock. Chances are that the Tiger, Gray and Eagle, and some other mines in Bradshaw mountains, will be worked in the spring. Complaint is made that the owners of patented mines will not work them, nor will they permit others to do so. If owners of such mines do not care to run them, they ought to lease them to responsible miners. Flush times are expected in Tonto basin and Cherry creek districts, where moneyed men are preparing to operate. Scarcity of water prevents placer miners from washing gulch gravel, but many of them are doing well with rockers, and not a few are making wages with pans.

YAVAPAI M. & M. CO.—J. W. Coover, of the St. Louis Yavapai Mill and Mining Co., says the Phenix Herald, with Gus Bauer, came down from Trip Top to-day, arriving a little after noon. They brought down five bars of bullion made from the ore on the dump of the old Trip Top mine. They average 935 fine and weigh 1285, 1251, 1255, 1277 and 1246 ounces respectively, making 6311 ounces. This shipment is directed to E. Hayden, treasurer of the company, in care of the Bank of Commerce, St. Louis, Mo. These bars represent the work of a stamp mill for two weeks. The ore is first crushed, then concentrated, 20 tons into one, by six Frue vanners, then roasted and amalgamated as in the ordinary process.

COLORADO.

SHIPMENTS.—La Plata Miner, Feb. 16: Shipments from the Aspen were resumed to-day. The Queen Anne is showing a good ore body, nearly pure galena. The Buckeye will be one of the leading outputters of the camp the coming season. A contract for 200 feet of tunnel work has been let on the Old Lot crosscut to Ouray parties. The ore shipments were resumed yesterday, and the Red Mountain road is again in passable condition. The bond on the Little Annie and Red Mountain expired yesterday, but it is yet possible that a sale can be effected. Ben Hewitt is working 40 men in the

upper workings of the Old Lot. Good progress is being made on the big tunnel. Eight men comprise the force on the Sunnyside, and all are working in ore. A pile containing several carloads is in the orehouse. The Silver Lake has opened up five feet of ore, according to the latest news from the mine. There is an immense quantity on the dump. The late strike of mineral in the sixth level of the Silver Bell is about 14 feet wide, all solid ore, worth \$200 per ton. The ore has the appearance of extending into the mountain.

IDAHO.

THE CATHERINA.—Ketchum Keystone, Feb. 12: Messrs. Cleek and Stover, who have been working the Catherina mine during the winter, were in town in the early part of the week and give a very good report of the work accomplished during the past month. A progress of 32 feet was made in 16 days in sinking, and a vein of ore averaging six inches in width disclosed, all of high grade, and will go over 200 ounces to the ton. They expect by spring to have the mine in good working shape for next season, and also enough ore to pay them well for the winter campaign in Bassett gulch.

BLUE JACKET.—Gus Duer is in from his mine, the Blue Jacket, which is situated between the Elkhorn and Quaker City. He reports the prospect encouraging. An incline has reached the depth of 80 feet, dipping in a westerly direction. A drift is now being run on the vein, which shows a three-inch streak of 500 and 600-ounce ore. The vein matter is 18 inches in width, and shows better as work progresses. The indications are that a large body of ore will soon be found.

THE BACK PAY.—This mine is situated northwest of the Blue Jacket, and has been up to a late day worked by its owners, H. C. Lewis and Mrs. Dixon. They have ore, with indications for a good body. H. C. Manus has a claim in the vicinity of the Back Pay which offers inducements for thorough prospecting. A tunnel, which is now in 200 feet, will tap the vein at a depth of 300 feet.

MONTANA.

THE CABLE MINE.—Anaconda Review, Feb. 17: Mr. J. C. Savary, owner of the Cable mine, came down from Cable yesterday, and went up to Butte. He reports the Cable mine to be running full blast. It was started up on his return about 10 days ago, and has been running ever since. The breaking of the cylinder in the air compressor was the cause of the shut-down. The new cylinder of the air compressor has been put into position and is working satisfactorily. Work is also being done with the diamond drill.

THE PYRENEES.—From C. H. Moore, superintendent of the Pyrenees mine, who was in town last week, we learn the following items with reference to the mine at Georgetown. The Pyrenees mine is now running full blast, as it has been for the last 10 months. It is running on ore from the recent strike and is paying well. It is giving steady employment to 22 men. Large bodies of fine ore are in sight, and it is impossible for the present works to keep pace with the development of the mine. It is likely that extensive additions will be made to the present 10-stamp mill early in the spring. The Pyrenees shaft is now down to a depth of 220 feet, and the property continues to look better with every foot of depth. The Grubstake, near Georgetown, is considered a very promising prospect. Nothing is being done on it this winter. Some development work is being done on the Southern Cross mine, owned by Salton Cameron. An incline shaft is being sunk and has already reached a depth of 100 feet. There is between three and four feet of snow on the ground in the vicinity of Georgetown.

GRANITE.—Phillipsburg Mail, Feb. 15: Mill moving steadily and crushing the usual amount of ore.

HOPE.—The Hope mill is running steadily; any quantity of ore in the mine. Nothing worthy of note in connection with company affairs since our last issue.

BI-METALLIC.—Shaft still going down. Three shifts of men are making fair progress. The country rock is a hard gray granite. Level development shows the bonanza to improve west, the level east not showing so well. The floor of this level cannot intersect tunnel No. 6 of the Granite, there being a difference of 190 or 200 feet between the two. The Blaine has at present the deepest ore working in the granite country.

WEST GRANITE.—The north crosscut is in from the station 20 feet, header in very hard and compact gray granite. Two shifts are driving ahead as fast as the above unfavorable conditions will permit. The shaft started on the Fraction, near the southwest corner of the Granite Extension claim, is under cover, and down 30 feet. Work has been stayed here, owing to the inclemency of the weather. It is claimed that this shaft will penetrate the vein exposed in No. 6 level at a depth of 70 feet or less. Just above this working and distant but a few feet east of it the Granite Co. is also sinking. Nothing definite can be ascertained as to their purpose for doing this work aside from the report that it will be used as an air shaft for No. 6. As a matter of fact nothing reliable can be ascertained as to the intentions of either company in relation to the ledge in the Granite or Fraction ground. Just where it is or anything about it is left entirely to conjecture. The idea seems to prevail that these mines should be removed from the district, one being left in Helena and the other in St. Louis.

LOWER WILLOW CREEK.—Bastion & Co. are working the Screamer lode with good results. The tunnel is now in 108 feet, with three feet of concentrating ore of excellent quality to the footwall. The vein improves with depth, and if the present showing continues as favorable a large amount of milling ore will be on the dump ready for shipment by May 1. Mr. B. has seven men at work and will, as soon as the weather permits, put more men on and open out the Silver Crown, a lode adjoining the Screamer on the south.

FLINT CREEK CANYON.—Mellan & Co. have one shift of men working on their lode. The header of the tunnel shows about 10 inches of very high-grade rock.

ALICE COMPANY SHUT DOWN.—Butte Inter-Mountain, Feb. 19: Superintendent W. E. Hall, of

the Alice, gave orders today to shut down the company's mills and mines. The cause of this movement is that there is no salt to be had. Mr. Hall had a very large supply on hand before the railroad blockade, in fact all that he could store away, as he had anticipated the danger some time ago and thought he would be prepared for any emergency. He had over 150 tons stored away, which was all he could handle, but, as it had been over two weeks since any salt arrived, the supply on hand naturally gave out. Mr. Hall regrets very much having to shut down, as it causes quite a loss to the company as well as to the employees. The blame, of course, can only be attached to the elements. Work will be immediately resumed on the arrival of salt. The Silver Bow mill shut down for the same cause last Wednesday. The Moulton and Lexington mills have a limited supply of salt on hand which will only run them a few days more.

NEW MEXICO.

MAGDALENE DISTRICT.—Socorro Bulletin, Feb. 12: Wm. Trimble is dumping ore out of the Juana contract. Reports of an important strike of gold not far from Kelly are current. Supt. Huber, of the Kelly, is south, inspecting some valuable properties of Mr. Gustav Billing. Hollenbeck & Clark are dumping excellent galena and carbonate mineral out of their Miriam claim. The Imperial mine continues to be deepened and explored under the superintendency of H. D. Bates. J. W. Virgin and A. Hasty are dumping argentiferous galena from their Hop Canyon claims, which also afford gold. The Bennett and Stephenson mines in the Organs are both being actively worked, and the ore shipped to Socorro for treatment. Shep Lewis is sacking ore out of his Badger group, preparatory to shipping to Socorro. These properties are situated at the north end of the Magdalenas, some distance north of the railroad track. Work on Roseboom's Spring Lode, in Patterson canyon, will be resumed as soon as he has pumping machinery to exhaust the water which now impedes its development. The construction of the wagon road from the Cavern mine to the railroad track at Kelly is still under way. W. H. Patterson is the contractor. He is also to deliver 200 tons of Cavern ore on the cars, all of which is to be completed in 40 days. Work on the mine has been suspended until the road is completed, when the extraction of ore will be resumed. The boys in the Graphic and Greyhound are striking excellent grade ore at every point in these properties. They can at any time flood the Graphic smelter with high-grade lead fluxing ore. The silver value of the ore has materially increased within a few months past. Supt. Koneman is now employing 45 men and ships from five to six cars of ore daily.

TUNNEL.—Black Range, Feb. 15: The contract to run the Midnight tunnel which is now about 85 feet in length, 150 feet farther, has been let to Billy James and John Bwetic. The contractors left yesterday for the scene of operations with supplies, and work will be commenced immediately. Jim Smith and Andrew Kelley returned this week from the alleged gold discovery in the San Mateo's. They report adversely to the glowing accounts which were circulated. But, however, while there Smith saw some very nice specimens, which Kelley says made Smith's mouth water. For further particulars see Smith.

NO GOLD.—The San Mateo gold find does not pan out, and is simply a farce. The pay streak of the alleged bonanza is very small and irregular, the ore running about 40 per cent silver and about the same percentage in lead, the gold is yet to be found. So the Range is informed by those who examined the property. The Pitcher Bros. are working their St. Cloud mine. They are drifting on the lead both ways from the shaft in a good body of ore. The St. Cloud will make a carload shipment of ore in a few days. If other mine-owners of this district would follow the example of the owners of the St. Cloud they would find it much more profitable than letting their properties lie idle. Idle mines pay small dividends.

OREGON.

CANYON CREEK.—Cor. Rogue River Courier, Feb. 14: Everything seems to be running lively in the various mining claims of this section. Brown, Naucke & Co. are running their pipe a good portion of the time, and shoveling off the gravel at a lively rate; but the increase of water in their diggings will be a big thing for them. Russ and Brown are piping all the time with a good prospect of making it "pan out" this season. Naucke, Brown, Hall, Bybee & Co. are making the gravel fly lively with a big head of water. I understand through Mr. Brockman, the foreman, that they have struck it very rich. They did well last year, but will do a great deal better this year. John Havlin is piping, when he has water, but has been short of water a part of the season. Oscar Green is doing good work in his claim with a large self-shooter. Hamilton works his mine when he feels like it; as he has plenty of money, he can take it easy. Butler did not get his ditch completed last summer, hence is not doing much in his claim. He is working on his quartz in Lightning gulch, which has indications of being very rich. Harry Stone's valuable placer mines are lying idle, because he is not able to superintend them. Alex. Watts has his pipe in full motion, with the best of prospects, in his claim in Day's gulch. It is thought he will make a large cleanup.

UTAH.

ORE.—Southern Utah Times, Feb. 16: O. T. Clark has opened a fair body of ore in Monitor. The Horn people have shut off the night shift at the mine. North Star chlorides are doing profitable work, as is shown by the four-car shipments of recent date from Milford. James Barratt has made a strike of high-grade ore in the Jobanna mine, and will soon make a shipment from his headquarters in Star. Sam T. Godbe has been working a few men on the Summit mine in Bradshaw, with good results, and teams have been put on to haul the ore to Milford. A new and important strike has been made in the Cave mine in Bradshaw, property of the Godbe people. Jones & Co., bankers, and James Lavelle, are the lucky ones.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING FEBRUARY 8, 1887.

- 357,358.—COLLAR-BUTTON—L. Paet, S. F.
- 357,169.—SPRING SHACKLE—Bergman & Miller, Bienen Vista, Ogn.
- 357,367.—FLOAT FOR CARRYING LINES OF PIPES FOR DREDGES—E. Chaquette, S. F.
- 357,373.—PROGRAM ALARM CLOCK—Ellen Cushing, S. F.
- 357,392.—SPECTACLE FRAME—W. R. Johnston, S. F.
- 357,395.—WATCH CASE—J. C. Landman, Eureka, Nev.
- 357,212.—HORSE-POWER—B. A. Lombard, Stockton, Cal.
- 357,329.—TENT—M. P. McKoon, El Cajon, Cal.
- 357,402.—FILTER—McLean & Cumming, S. F.
- 357,411.—HEATING APPARATUS—R. A. Rew, Pomroy, W. T.
- 357,413.—HYDRAULIC RAM—John Richards, S. F.
- 357,424.—BALANCED SLIDE VALVE—A. J. Stevens, Sacto.
- 357,246.—WINDOW SASH—T. A. Sweet, Paso Robles, Cal.

FOR WEEK ENDING FEBRUARY 15, 1887.

- 357,652.—WINDMILL—D. P. Barrett, Oakland, Cal.
- 357,822.—HARVESTER REEL—Jos. Gilbert, Los Angeles, Cal.
- 357,664.—CLIP FOR WIRE ROPE WAYS—A. S. Hildie, S. F.
- 357,773.—SHELL EXTRACTOR—C. H. Keenan, Ft. Halleck, Nev.
- 357,775.—EVAPORATOR—W. F. Lambert, S. F.
- 357,612.—CAR AXLE—I. W. Lewis, Portland, Ogn.
- 357,841.—HOEING AND RAKING MACHINE—D. Lubin, Sacto.
- 357,842.—CLOD-CRUSHER—D. Lubin, Sacto.
- 357,843.—CLOD-CRUSHER—D. Lubin, Sacto.
- 357,844.—CLOD-CRUSHER—D. Lubin, Sacto.
- 357,798.—VAPOR-BURNER—Wm. Wainwright, S. F.
- 357,799.—SPRINKLER—Wm. Wainwright, S. F.
- 357,802.—FOG-HORN—Geo. White, S. F.
- 17,111.—DESIGN—W. V. Arthur, Oakland, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Mining Share Market.

The leading Washoe stocks diminished in value materially at the close of the week. There is considerable interest in Ophir just now, indications pointing to a development in that mine at greater depth. The next point of interest north of the Ophir is the extension of north drift on 1300 level in the Mexican, and the progress of the East crosscut at the Ophir North line on the same level. In the exploration on the 500 level in the Mexican mine a broad belt of mineralized decomposed matter, of which the component parts were heavy clay and quartz, was exposed. Subsequent explorations of the downward extension of this belt on the 700 level disclosed that the mass was concentrating, and inspires a well-grounded hope that the entire belt will be found developed into ore at a greater depth. Hence the interest in the present operations on the 1300 level. The Virginia Chronicle of the 21st says: The 29 stamps in Six mile canyon are hung up on account of the low temperature of last week freezing solid the water of the creek which supplies the quartz mills with motive power. Following is a list of the mills shut down and the complement of stamps in each: Bowie's, 5; Hully's Empire State, 5; Fisher's, 2; Hully's Flowery Mill, 5; Courser, 5; Bossell, 5; Pfeiffer's, 2. The Winfield mill, in Seven-mile canyon, has a complement of five stamps and is operated by steam-power. It is owned by A. J. McCone and has been shut down nearly two years. When these mills are in operation they represent a combined crushing power of 100 tons of ore every 24 hours during high water in the creek.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Alice, Feb. 16, \$28,192; Hanauer, 13, \$4700; 15, \$12,000; 17, \$6300; Crescent, 18, \$2190; Hanauer, 18, \$8800; 19, \$2625; Ontario, 18, \$53,863; Bannock, 16, \$2600; Silver Reef sulphides, 18, \$1600. Wells, Fargo & Co., Salt Lake, received last week \$76,409; McCormick & Co., \$73,355; T. R. Jones & Co., \$14,435. The metal shipments out from Salt Lake city for the week ending February 10th were 11 cars of bullion, 290,650 pounds; 44 cars silver ore, 991,642 pounds; 4 cars copper ore, 112,950 pounds; total 59 cars, 1,395,242 pounds.

MECHANICS' INSTITUTE TRUSTEES.—The annual election for trustees of the Mechanics' Institute, to serve for two years, was held Wednesday, and resulted in the election of the following gentlemen: Columbus Waterhouse, Geo. Spaulding, C. F. Bassett, James Spiers, I. C. Stamp, S. J. Hendy and John Mallon.

THE Lidgerwood Manufacturing Company, 95 Liberty street, New York, has just issued a new catalogue for 1887. It is replete with everything in the way of hoisting engines and apparatus, including boilers. Copies cheerfully furnished to engineers and prospective buyers.

JOHN GILMAN writes the Hailey (Idaho) Times from Worcester, Mass., that he has organized a railway company there to build a railroad to the gold belt, and has purchased the rails. The company has a capital stock of \$800,000. The length of its road is to be 18 miles.

Table of Lowest and Highest Sales in
S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 3.	WEEK ENDING Feb. 10.	WEEK ENDING Feb. 17.	WEEK ENDING Feb. 24.
Alpha.....	1.90	2.00	2.25	2.50
Alma.....	1.25	2.00	1.30	1.80
Andes.....	.80	1.15	.75	.90
Argenta.....	.15	.15	.15	.15
Belcher.....	2.50	3.50	2.50	3.00
Brophy.....	.50	.70	.40	.75
Bullion.....	1.65	2.50	2.00	2.40
Bullion.....	.50	.90	.60	.75
Bullion.....	.25	.30	.40	.35
Bullion.....	1.80	2.00	1.50	1.90
Bullion.....	.30	.55	.45	.35
Bullion.....	1.00	1.10	1.15	1.30
Bullion.....	.20	.25	.19	.24
Bullion.....	1.30	1.60	1.75	2.00
Bullion.....	.65	.75	.65	.70
Bullion.....	5.50	7.00	7.75	8.00
Bullion.....	1.00	1.60	1.40	1.55
Bullion.....	.30	.50	.40	.55
Bullion.....	2.75	5.25	8.75	10.50
Bullion.....	1.05	1.10	.90	1.10
Bullion.....	.50	.55	.40	.55
Bullion.....	.25	.25	.10	.10
Bullion.....	1.70	1.00	1.10	1.30
Bullion.....	5.25	5.75	6.75	6.75
Bullion.....	1.15	1.60	1.35	1.50
Bullion.....	.45	.55	.95	1.05
Bullion.....	5.00	8.50	5.50	6.25
Bullion.....	.25	.25	.25	.40
Bullion.....	1.00	1.25	1.30	1.50
Bullion.....	.45	.65	.70	.70
Bullion.....	.90	1.30	1.40	1.55
Bullion.....	.25	.25	.15	.15
Bullion.....	1.15	1.25	1.20	1.25
Bullion.....	.15	.25	.20	.25
Bullion.....	.50	.55	.95	1.05
Bullion.....	5.00	7.25	6.50	6.25
Bullion.....	3.50	3.75	4.00	4.00
Bullion.....	.45	.55	.95	1.05
Bullion.....	3.10	3.50	3.75	4.00
Bullion.....	.90	.95	1.50	1.55
Bullion.....	.50	.55	.40	.45
Bullion.....	3.00	3.40	2.60	3.50
Bullion.....	.90	1.30	1.40	1.55
Bullion.....	.75	1.15	1.05	1.10
Bullion.....	7.00	9.50	7.00	7.50
Bullion.....	.60	.65	.70	.75
Bullion.....	.40	.55	.45	.40
Bullion.....	.30	.30	.10	.10
Bullion.....	.50	.75	6.00	6.25
Bullion.....	3.50	5.75	5.25	4.95
Bullion.....	.20	.30	.25	.30
Bullion.....	.75	.75	.10	.10
Bullion.....	1.00	1.10	.75	1.00
Bullion.....	.55	.55	.10	.10
Bullion.....	2.00	2.00	.40	.40
Bullion.....	.50	.50	.15	.15
Bullion.....	5.00	6.00	6.00	7.25
Bullion.....	.90	1.20	1.30	1.35
Bullion.....	3.50	4.20	4.25	4.40
Bullion.....	.50	.50	.40	.40

Sales at San Francisco Stock Exchange.

THURSDAY Feb. 24, 1887.	50 Holmes.....	2.95
50 Andes.....	100 Iowa.....	.55
200 Argenta.....	200 Justice.....	1.10
50 B. & Belcher.....	200 Lady Wash.....	1.10
370 Bullion.....	820 Montana.....	.50
300 Bodie Con.....	200 Mt. Cory.....	.75
325 Belcher.....	740 Mono.....	.30
100 Baltimore.....	200 N. Belle Is.....	.45
500 Belle Isle.....	1500 Ner. Quin.....	.40
200 Benton Con.....	770 Opur.....	.80
110 Chollar.....	350 Overman.....	1.50
140 Con Va. & Cal.....	200 Peerless.....	.60
120 Crown Point.....	400 Potosi.....	.70
600 Crocker.....	200 Potosi.....	.40
100 Con. Imperial.....	375 Savage.....	.30
200 Central.....	300 Scorpion.....	.70
150 Challenge.....	650 Sierra Nevada.....	.40
75 Caledonia.....	300 Silver Hill.....	.40
220 Eschscholtz.....	300 Sprague.....	.40
100 East B. & B.....	200 Union Con.....	.30
950 Gould & Curry.....	50 Utah.....	.35
300 Hale & Norcross.....	200 Yellow Jacket.....	.40

San Francisco Metal Market.

ANTIMONY—French Star.....	95 @	—
BORAX—San Bernardino.....	— @	8
Amargosa.....	— @	20
Iron—Hemlock.....	— @	20
England, ton.....	— @	22
American Soft, No. 1, ton.....	24 @	24 50
Oregon Pig, ton.....	21 @	23 00
Clippert Gap, Nos. 1 & 4.....	22 @	23 50
Clay Lane White.....	21 @	25
Shots, No. 1.....	23 @	50
COPPER—		
Bolt.....	25 @	—
Sheeting.....	15 @	23
Ingots.....	12 @	13
LEAD—Pig.....	4 75 @	—
Bar.....	5 25 @	5 50
Sheet.....	8 @	—
Shot, discount 10% on 500 bag Drop, 3 bag.....	1 65 @	—
Buck, 3 bag.....	1 85 @	—
Chilled, do.....	2 05 @	—
QUICKSILVER—By the flask.....	38 50 @	39 50
Flasks, new.....	1 05 @	—
Flasks, old.....	1 35 @	—
STEEL—English, B.....	14 @	15
Black Diamond, ordinary sizes.....	10 @	—
Plow.....	4 @	5
Machinery.....	5 @	6
Sandwich Bros.....	10 @	—
ZINC—German.....	8 @	9
Sheet, 7x3 ft, 7 to 10 lb, less the cask.....	6 @	—
TINPLATE—Coke.....	4 25 @	4 35
Charcoal.....	6 40 @	6 50

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.
G. W. LEWIS—Arizona.
E. L. RICHARDS—San Diego Co.
R. C. HUSTON—Los Angeles and San Bernardino Cos.
CRO. McDOWELL—Fresno and Tulare Cos.
M. S. PRINCE—San Joaquin and Alameda Cos.
T. P. POWERS—Napa and Sonoma Cos.
J. L. DOWLE—Tuolumne and Calaveras Cos.
W. J. FERRIS—San Bernardino and Butte Cos.
A. J. HARR—El Dorado Co.

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COMPANY.	LOCATION.	No. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Con M Co.....	Nevada.....	21.....	50. Jan 12. Feb 17.....	Mar 10. L. Osborn.....	319 Montgomery St
Andes S M Co.....	Nevada.....	31.....	25. Jan 24. Mar 3.....	Mar 23. B. Burris.....	309 Montgomery St
Bodie S M Co.....	Nevada.....	35.....	50. Feb 3. Mar 10.....	Apr 5. W. F. Watson.....	302 Montgomery St
Bodie Con M Co.....	California.....	8.....	50. Jan 23. Feb 28.....	Mar 23. G. W. Seaside.....	309 Montgomery St
Bullion M Co.....	Nevada.....	32.....	40. Jan 23. Mar 1.....	Mar 17. R. R. Grayson.....	327 Pine St
Benton Con M Co.....	Nevada.....	17.....	25. Jan 23. Mar 21.....	Mar 24. W. H. Watson.....	302 Montgomery St
Camp Creek Placer M Co.....	California.....	1.....	10. Jan 20. Mar 10.....	Apr 14. G. W. Miller.....	306 Pine St
Four Hills Mine.....	California.....	1.....	25. Jan 22. Feb 28.....	Mar 21. F. S. Moody.....	310 Phelan Block
Golden Fleece Gravel M Co.....	California.....	8.....	10. Jan 27. Mar 8.....	Mar 26. W. J. Gleason.....	323 Montgomery St
Hubert Concentrator Co.....	California.....	1.....	10. Jan 27. Feb 20.....	Mar 14. M. Livingston.....	230 Montgomery St
Hazard Gravel M Co.....	California.....	1.....	03. Jan 26. Mar 1.....	Mar 28. J. T. McGeoghegan.....	323 Pine St
Klucaid Flat M Co.....	California.....	1.....	2.00. Jan 5. Feb 14.....	Mar 7. W. H. Keith.....	432 California St
Loe Jack M Co.....	California.....	1.....	05. Jan 27. Mar 7.....	Mar 23. J. M. Bullerton.....	308 California St
Lady Washington M Co.....	Nevada.....	8.....	25. Jan 23. Mar 7.....	Mar 22. W. H. Watson.....	302 Montgomery St
Manhattan S M Co.....	Nevada.....	2.....	1.00. Feb 2. Mar 7.....	Mar 22. J. Crockett.....	327 Pine St
Mexican G & S M Co.....	Nevada.....	33.....	25. Jan 4. Feb 9.....	Mar 2. C. E. Eliott.....	309 Montgomery St
Mexican Tunnel G M Co.....	California.....	3.....	15. Jan 25. Feb 23.....	Mar 1. A. B. Muller Jr.....	Safe Deposit Building
Mayflower G M Co.....	California.....	34.....	25. Jan 19. Feb 15.....	Mar 13. J. Modio.....	322 Montgomery St
North Comstock M Co.....	Nevada.....	2.....	10. Jan 13. Feb 14.....	Mar 1. F. E. Dietz.....	327 Pine St
North Belle Isle M Co.....	Nevada.....	11.....	50. Jan 12. Feb 15.....	Mar 9. J. W. Pew.....	310 Pine St
Nevada Queen M Co.....	Nevada.....	1.....	30. Jan 11. Feb 8.....	Mar 3. H. Davis.....	309 Montgomery St
Nevado M Co.....	Nevada.....	16.....	25. Jan 7. Feb 10.....	Mar 3. J. W. Pew.....	310 Pine St
N. Banner Con M Co.....	California.....	15.....	01. Jan 1. Feb 2.....	Mar 26. T. J. Mitchell.....	Grass Valley
Overman S M Co.....	Nevada.....	37.....	30. Jan 21. Feb 25.....	Mar 18. G. D. Edwards.....	414 California St
Occidental M Co.....	Nevada.....	8.....	40. Feb 3. Mar 10.....	Mar 31. A. K. Durbin.....	333 Montgomery St
Phelps Manufacturing Co.....	California.....	1.....	5.00. Feb 12. Mar 21.....	Apr 5. W. H. Phelps.....	17 Drumm St
Phenix Con M Co.....	California.....	2.....	1.45. Jan 28. Mar 5.....	Mar 25. C. Collichon.....	616 California St
Pennsylvania Con M Co.....	California.....	5.....	01. Jan 4. Feb 7.....	Mar 1. M. Byrne Jr.....	308 Valley
Pneumatic M Co.....	California.....	2.....	20. Jan 4. Feb 14.....	Mar 8. H. Pichor.....	320 Sansome St
Sierra Nevada S M Co.....	Nevada.....	37.....	25. Jan 4. Feb 9.....	Mar 1. E. L. Parker.....	309 Montgomery St
Spring Valley M Co.....	California.....	2.....	24. Jan 22. Mar 5.....	Apr 4. H. Pichor.....	320 Sansome St
Sierra Iron Co.....	California.....	6.....	2.00. Feb 17. Mar 30.....	Apr 28. H. P. Bush.....	431 California St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Alabama, Humboldt & Bailey Co.s.....	W. H. Watson.....	302	Montgomery St.....	Annual.....	Feb 28
Anglo-Mexican M Co.....	Mexico. C. A. Moore.....	217	Sansome St.....	Annual.....	Mar 8
Cosmopolitan M Co.....	B. Burris.....	309	Montgomery St.....	Annual.....	Mar 8
Hale & Norcross M Co.....	J. F. Lightner.....	309	Montgomery St.....	Annual.....	Mar 9
Nevada S M Co.....	Nevada. E. M. Hall.....	314	Montgomery St.....	Annual.....	Mar 9
Potosi M Co.....	Nevada. O. E. Elliott.....	309	Montgomery St.....	Annual.....	Mar 9
Sutro Tunnel Co.....	Nevada. P. W. Ames.....	320	Sansome St.....	Annual.....	Mar 7

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.....	Nevada.....	A. W. Havens.....	309 Montgomery St.....	50.....	Feb 10
Martin White M Co.....	Nevada.....	J. Seville.....	308 Montgomery St.....	25.....	Dec 20
Paradise Valley M Co.....	Nevada.....	W. Letts Oliver.....	325 Montgomery St.....	10.....	Nov 30
Silver King M Co.....	Arizona.....	J. Nash.....	323 Montgomery St.....	25.....	Feb 15

New York Metal Market.

Telegraphic advices dated Feb. 24th give the following New York prices:

BAR SILVER—\$1.01 1/2 per oz.
BORAX—5 1/2 @ 6 1/2 c.
COPPER—LAKES—\$10 1/2 @ \$11.
IRON—No. 1, \$22.00 @ \$22.50.
LEAD—\$4.37 1/2.
QUICKSILVER—52 @ 54 c.

The following is the latest by mail from the "New York Metal Exchange Market Report":
COPPER—Dull, spot closing at 10.75 @ 11.00.
Transferable Notices (Lake) issued at 11.85 @ —.
Transferable Notices (Chili Bars) issued at 4.39 1/2 @ 6.

LEAD—Quiet at \$4.35 @ 4.40 spot. Transferable Notices issued at \$4.47 1/2.
TIN—Dull at \$22.45 @ 22.55. Transferable Notices issued at \$22.50.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.60 @ 22.80; Billiton Tin, \$23.10 @ 23.40; Banca Tin, \$23.15 @ 23.50; Baltimore Copper, \$10.00 @ 10.25; Orford Copper, \$10.00 @ 10.50; P. S. C. Copper, \$10.00 @ 10.50; Foreign Lead, \$4.75 @ 4.85; Foreign Spelter, \$4.75 @ 4.85.

MAKER'S PRICES—At tidewater, 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$21.50 @ 22.50; No. 2, \$20.00 @ 21.00; Grey Forge, \$17.50 @ 19.00. Hudson River, Grade No. 1, \$22.00 @ 22.50; No. 2, \$20.00 @ 21.00; Grey Forge, \$16.00 @ 16.25. Southern, Grade No. 1, — @ —; No. 2, — @ —; Grey Forge, — @ —.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irremediable party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

THE Walker Lake Bulletin says the Mount Diablo mill will soon be completed. A large quantity of ore will be ready for reduction.

GO TO THE OLDEST AND BEST!

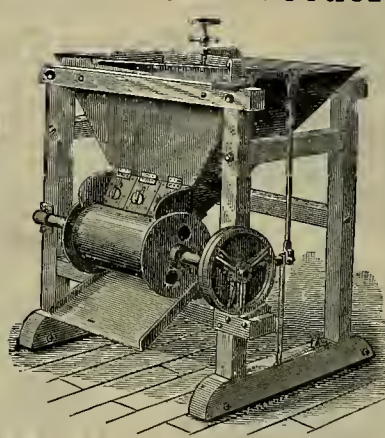
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DEAL'S BUSINESS COLLEGE,
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Send for Circular.

THE ORIGINAL
Roller Ore Feeder

This form of Ore Feeder is well adapted for its peculiar work.

In reference to a similar form of "Roller" Feeder, which is being manufactured and offered for sale in this city, and of which a cut appears in this journal, we have to say that the Superintendent of the Bunker Hill Gold Mining Company states that the "Challenge" is far superior to the "Roller" Feeder, having had both of them operating side by side. We shall be pleased to show this letter, upon application, to any one interested.

We are also manufacturers of the "Challenge" and "Stanford Improved."

Prices furnished by the
JOSHUA HENDY MACHINE WORKS,
89 to 91 Fremont St. San Francisco.

ORE FEEDERS.

We direct attention to an advertisement, which appears in our journal, of the "Original Roller" Ore Feeder, manufactured by the "Joshua Hendy Machine Works," of Nos. 89 to 91 Fremont St., this city.

As the manufacturers of a similar form of Feeder, known as the "Templeton Roller," claim that it is superior to any other style, and cite those in operation at the "Bunker Hill" mill in Colorado county, we expressly contradict the statement, and in substantiation submit a copy of a letter shown to us by a representative of the "Joshua Hendy Machine Works," which speaks for itself.

BUNKER HILL GOLD MINING CO.,
AMADOR CITY, CAL., July 12, 1886.

To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: We have used the "Challenge" and "Roller" or "Templeton" Ore Feeders in our mill for the past three years, and I am free to say that I consider the "Challenge" far superior to the "Roller" Feeder, in that most important of all things in a quartz mill, namely, the regular feeding of ore to the batteries. If the "Roller" Feeder is regulated to feed finely pulverized ore, the coarser ore will choke the outlet of the Feeder, and no ore can reach the batteries. If, on the other hand, it is regulated to feed coarse ore, then the fine ore when it comes will elude right through and fill the batteries. The "Roller" Feeder requires constant attention. Yours truly,
(Signed) N. W. CROCKER, Supt.
SAN FRANCISCO, Jan. 3, 1887.

To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: Having used four (4) of the "Roller" or "Templeton" Ore Feeders, built by the Golden State and Miners' Iron Works, of this city, for more than a year last past, in the Bello Copher Mill, in El Dorado county, this State, and being acquainted with the superior principle of construction and the operation of the "Challenge" Feeder built by yourselves, I unhesitatingly indorse the statements made by Mr. N. W. Crocker, Superintendent of the "Bunker Hill" Gold Mining Company, under date of July 12, 1886, as to the irregularity of the feed of the "Roller" or "Templeton" Feeder under the conditions of use which he names, and I am very truly yours,
(Signed) W. G. ROBERTS,
Of Greenwood, El Dorado Co., Cal.

BACK FILES of the MINING AND SCIENTIFIC PRESS (unbound) can be had for \$3 per volume of six months. Per year (two volumes) \$5. Inserted in Dewey's patent binder, 60 cents additional per volume.

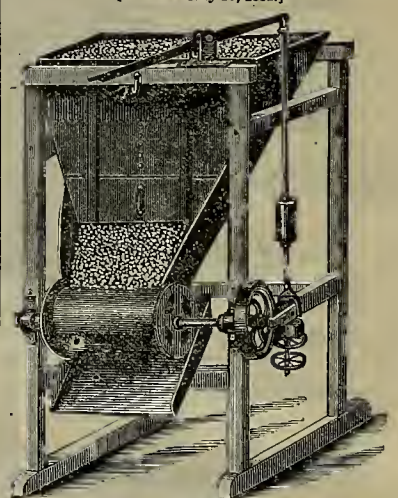
ASSESSMENT NOTICE.

The Phelps Manufacturing Company.—Location of principal place of business, San Francisco, California. Location of works, San Francisco, Cal.
NOTICE is hereby given, that at a meeting of the Board of Trustees, held on the 12th day of February, 1887, an assessment (No. 1) of Five Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, 17 Drumm street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 21st day of March, 1887, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Tuesday, the 6th day of April, 1887, to pay the delinquent assessment, together with costs of advertising and expense of sale. By order of the Board of Trustees,
W. H. PHELPS, Secretary.

OFFICE—17 Drumm St., San Francisco, Cal.

THE ROLLER ORE FEEDER

(Patented May 28, 1882.)



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

Golden State and Miners' Iron Works.

Sole Manufacturers,
227 First

H. P. GREGORY & CO.

Cor. Fremont and Mission Sts., - - - San Francisco, Cal.

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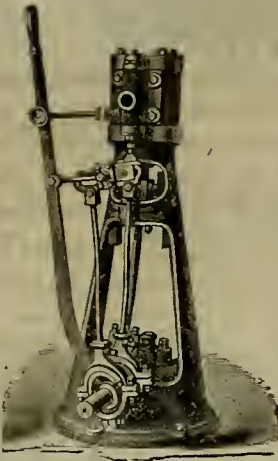
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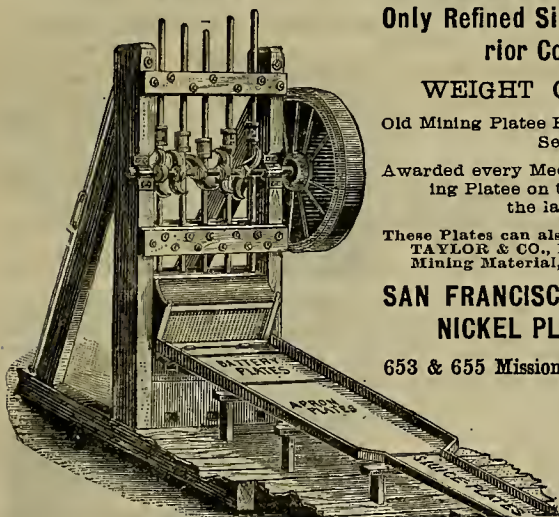
These Plates can also be purchased of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St., S. F.

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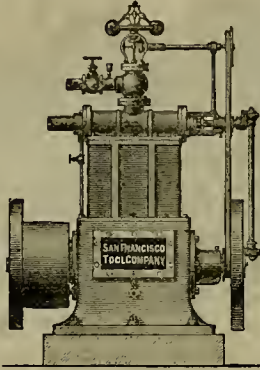
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TESTIMONIAL.OFFICE OF THE EUREKA ELECTRIC LIGHT CO., }
EUREKA, CAL., Feb. 15, 1887.

San Francisco Tool Co., San Francisco, Cal.—GENTLEMEN: In answer to yours of Feb. 8, 1887, would say: The four engines purchased from your Company in January, 1886, have been running continuously ever since, from 12 to 16 hours each day, not excepting Sundays, and have never given any trouble; and, furthermore, they have never cost us anything for repairs. I consider them fully as economical as our slide-valve engines, which we are using. One of them is a balanced valve, Haskins' make, and the other is the New York Safety Power Company's make. The relation to the cost of keeping your Single-Acting Engine in repair to the cost of keeping the Slide-Valve Engines which were purchased the same month we purchased your engines, and working under the same conditions, is, that while there has been no expense in either material, or labor on the engines furnished by your Company, the expense of keeping the Slide-Valve Engines in good running order, has cost, on an average, \$8 to \$12 per month for each engine.

A portion of the time the Single-Acting Engines have been run by the fireman, and I can recommend your engines to parties that are not close to a machine shop, and do not want to keep an engineer and fireman, as with your engine all the attention they require is to fill the oil cups once every 16 hours, and turn the steam on and shut it off. The balance of the time the engine takes care of itself. Yours truly,

A. A. OSBORN, Superintendent.



SINGLE-ACTING ENGINE.

CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

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HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.

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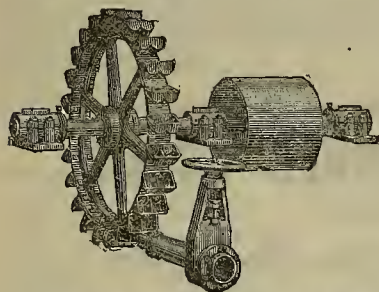
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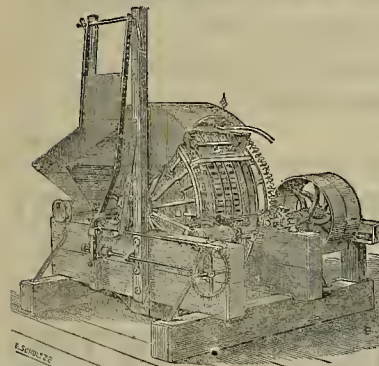
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Consumers are respectfully informed that owing to inferior brands of Coke having been sold
in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co.
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that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works,
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The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quanti-
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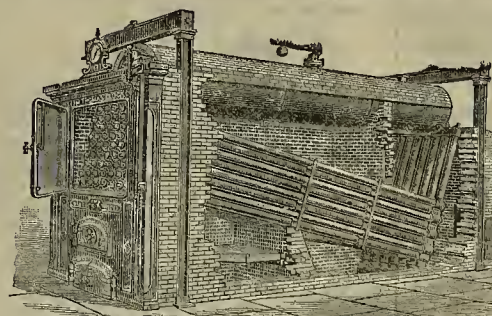
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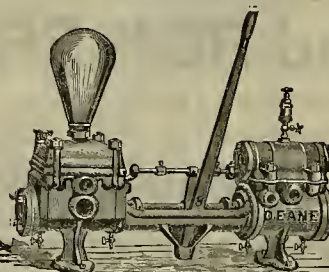
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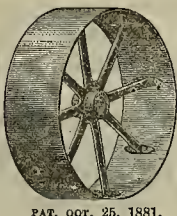
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**COAL MINES OF THE WESTERN
COAST.**

A few copies of this work, the only one ever published
treating of Pacific Coast Coal Mining, have been obtained,
and are for sale at this office for \$2.50 per copy. It was
written by W. A. Goodyear, Mining and Civil Engineer,
formerly of the California State Geological Survey.

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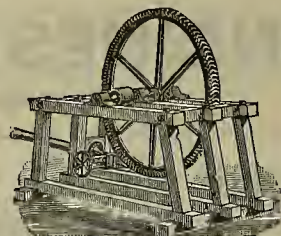
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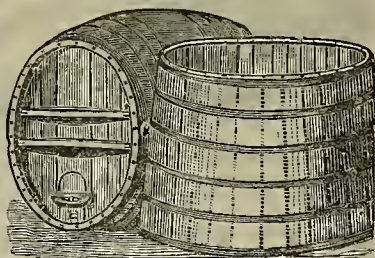
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PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS (\$575.00) F. O. B.

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), LONDON, October 5, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

ADAMS & CARTER.

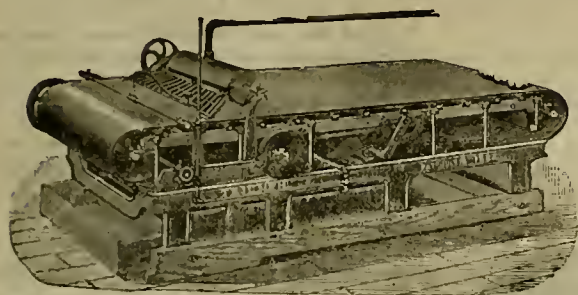
Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

THE FRUE ORE CONCENTRATOR OR VANNING MACHINE.

ADAMS & CARTER, Agents Frue Vanning Machine Co., Room 7, No. 109 California Street, SAN FRANCISCO, CAL.

\$1,000 CHALLENGE ACCEPTED,

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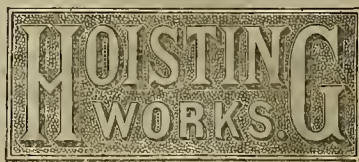
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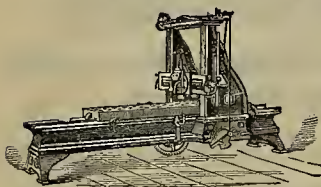
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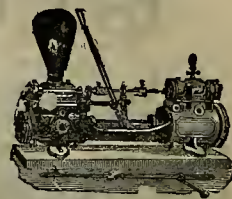
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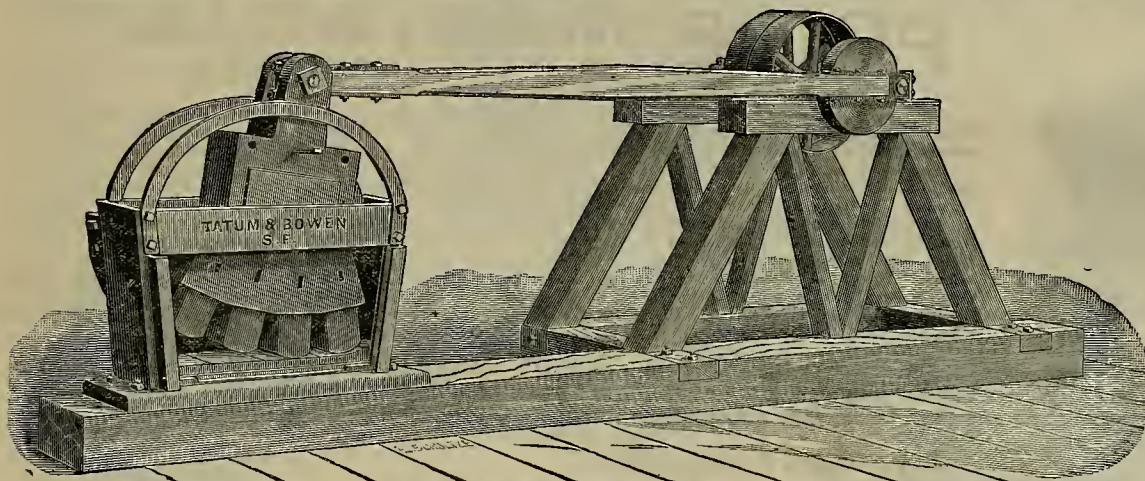
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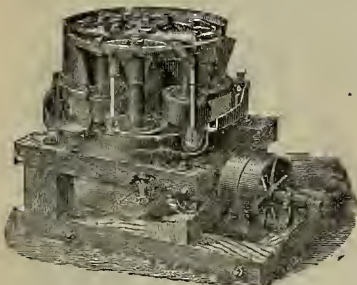
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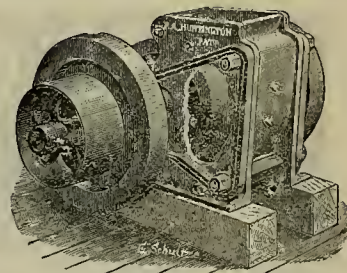
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MINING AND SCIENTIFIC PRESS.

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BY DEWEY & CO.
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SAN FRANCISCO, SATURDAY, MARCH 5, 1887.

VOLUME LIV
Number 10.

Alaska Mines.

The last steamer from Alaska brought down \$60,000 in hullion from the "Treadwell mine," on Douglas Island. This mine has one of the best gold mills in the United States. It was built in this city and has 120 stamps, run by water-power. It has a complete outfit of concentrators, etc., and has been successful from the start. The ledge is a very large one, composed mainly of low-grade ore, and yields from \$60,000 to \$75,000 a month. Other claims on the mainland near by will soon be developed.

More or less prospecting is going on in Alaska during the season, though at this time of the year little is done. Those who try to do much in winter in that region have a hard time of it. Recent Alaska papers contain an account of a trip of Tom Williams, a miner from Stewart river. A young Indian found him on the trail seven miles from

weather drove them back. It is thought a rich strike has been made, and the steamer Ynkon has been dispatched up the river to secure the cached mail, but had not returned when the Idaho left.

At Red Alder Gulch, Sutter county, this State, a minor named Thomas Dongan was killed by a snowslide, last week. He and two other men were asleep in their cabin, and he was awakened by a noise and ran out, shouting to his companions. The cabin was wrecked,

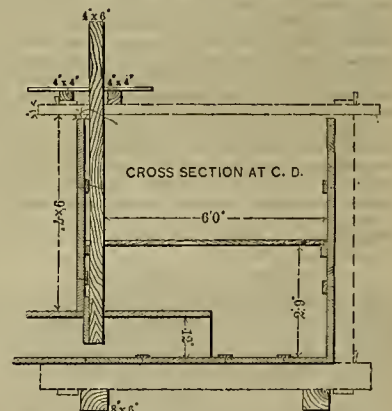
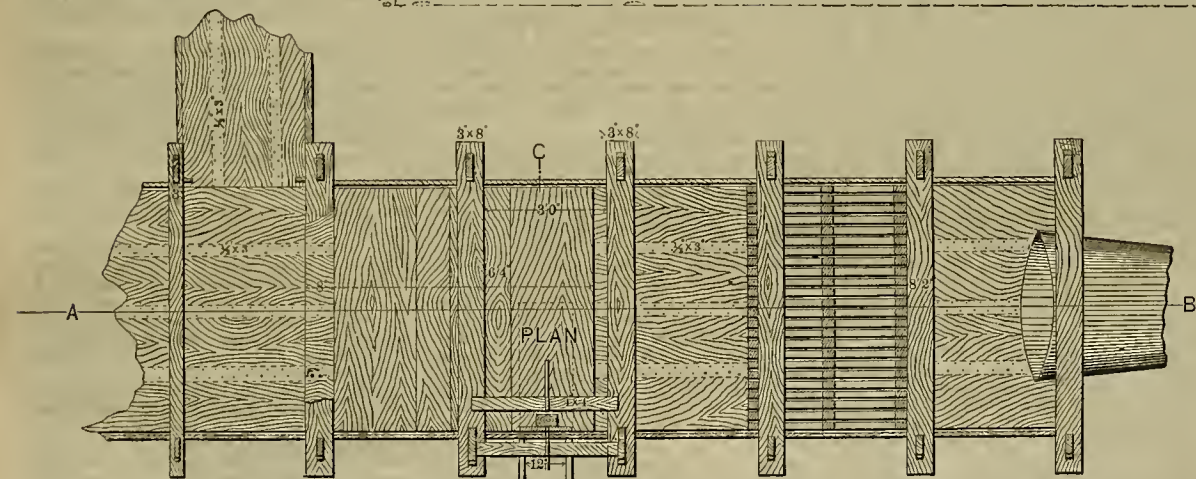
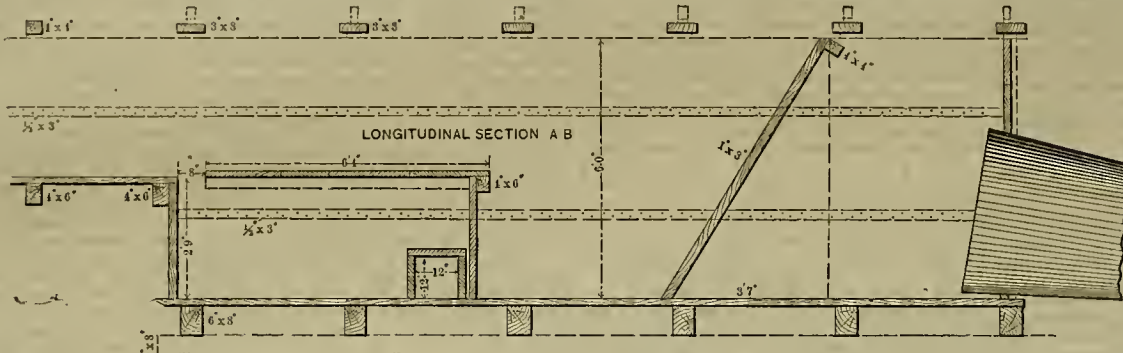
Pressure-Boxes for Mining Purposes.

The pressure-hox used in the bringing of water to hydraulic mines is situated at the end of the ditch, in a commanding position above the claim, and from it the water is delivered into the supply pipe.

The hox derives its name from the fact that the head or pressure is measured from this point. Connected with or forming a part of the pressure-hox is the sand-hox, which is sunk below the level of the flume or ditch, and ar-

of these pressure-hoxes, which we give herewith, the description being taken from the same work. The following is a description of a pressure-hox at the La Grange mine, Stanislaus county: Some 350 feet to the rear of the pressure-box there is a sand hox in the ditch connecting with the waste-way. This sand-hox is 2 feet deep (below the bottom of the ditch), 4 feet wide, and 4 feet 3 inches long, and communicates with the waste-way by means of a gate, which slides clear to the bottom of the hox. At the pressure-hox, the 4 end posts and

the two caps belonging to them are made of 6x8-inch lumber. The six intermediate posts, three on a side, are of 6x6-inch material, and their caps are of the same dimensions. All the sills, and the two longitudinal stringers on which they rest, are of 6x8-inch "stuff." Up to high-water mark the hox has a double lining made of two one and a half inch planks flattened at the



PRESSURE BOX BETWEEN DITCH AND SUPPLY PIPE IN HYDRAULIC MINES.

Healy and Wilson's store, famished and frozen, and the Indian packed and dragged him on a sled to the store. He was nearly dead, but Wilson gleaned from him that he had been 50 days making a trip in company with the Indians. They had three dogs and one sled. Two of the dogs gave out on the lake and the men traveled on snowshoes to the summit of the range, where they built a snow-house, which occupied four days of intense cold. The fifth day they abandoned the house, and in five days only made two miles. Williams died 36 hours after arriving at the store. Before dying he told Wilson that letters and gold-dust had been abandoned at the snow-house, principally for McQuestin; also stated that 100 men near Stewart were greatly excited over the discovery of coarse gold on Mill creek, and his main object was to reach San Francisco before McQuestin left. Nothing definite could be obtained from the dying man in regard to the strike, but it is thought he was on a secret mission and wanted McQuestin to bring in a large supply of goods. Parties went in search of the cached letters and dust, but the severe

and the two men somewhat hurt, but the one who had run out was the only one killed. He was hurried in the debris at the bottom of the gulch. A supply cabin, blacksmith-shop and an old outhouse were swept away also, but the 10-stamp mill at the mouth of the Kennebeck shaft escaped.

As soon as Congress adjourns, Senator Stanford will go to New York and Boston to consult with Francis A. Walker, in regard to the plans for his university in this State. He expects to begin five of the buildings this summer. Senator Stanford said that one of the more important things that he was considering was the selection of a president. He wants a man of affairs as well as a scholar. After he has selected a president, he intends to call the trustees together to select a corps of professors.

An explosion occurred on Tuesday in the Beanhean colliery at St. Etienne, France. Latest advices say there were 104 men entombed in the mine, and that 43 have been recovered and 16 are dead.

ranged to catch the gravel or sand carried along by the current. It is emptied by a side gate, as circumstances may require.

The pressure-hox is a large wooden receptacle, generally constructed of 1½-inch planks, and securely held together with timbers. It is sufficiently large and deep to keep the head of the pipe which enters it under water with a steady pressure.

A grating of bars is arranged to catch all floating material, such as sticks and leaves. The water should be quiet and sufficiently deep to prevent any air from being carried into the pipe. For this purpose the hox is divided into compartments, one of which receives the water and quietly discharges it into the second pipe through lateral openings. There should be no perceptible difference between the water supply and the discharge; or, if any, the former should be in excess, and the surplus should be regulated and discharged by a waste-gate placed near the end of the flume. Some pressure-hoxes are arranged for two pipes.

In Aug. J. Bowie, Jr.'s work on "Hydraulic Mining in California," are engravings of one

joints with strips one-half inch by four inches. A 22-inch pipe takes the water. Nine feet from the hox there is a five-inch diameter stand-pipe which extends two feet above the top of the pressure-hox.

In large claims the pressure-hox ranges from 10 to 20 feet in length with a single pipe, and, where two pipes are used, from 12 to 30 feet. Larger hoxes are also built where the pressure, sand and measuring-hoxes are combined in one.

The pressure-hox at the Bloomfield mine (see engravings) is 18 feet long and 6 feet wide, so arranged that the sand falls under a wooden diaphragm into a large chamber provided with a gate.

The Senate Appropriation Committee has increased the number of new cruisers authorized to be built in the Navy Appropriation bill from six to nine, and added several million of dollars to the bill as passed by the House.

There is to be a hullion refinery at Helena, M. T., in connection with the U. S. Assay office there. Bars only are to be produced,

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

The Extraction of Gold.

Loss by Amalgamation and the Remedy.

EDITORS PRESS:—The loss of gold in the battery, and by the usual methods adopted for its extraction from the ore, amounts to from 5 to 95 per cent of the amount actually present in the rock as shown by assay. This loss is dependent upon the refractory nature of the ore and the mechanical devices used in the process of extraction. The principal cause of loss is the want of perfect chemical contact between the gold alloy and the mercury in amalgamation. Much of this is due to the defective mechanical arrangements adopted for securing the gold, but the most of it is due to causes of a chemical nature, which the best mechanical manipulation can but partly overcome; e. g., pyritic rocks, when ground, generally "flour" the mercury, and true chemical contact between the gold and the mercury is by this means much impeded or entirely prevented. Metallic arsenides or sulphides, sulphur and sulphureted hydrogen are frequently active in producing this "flouring" of the mercury. Mr. Skey has shown us by his experiments that the most active cause of "flouring" in many ores is the protochloride of iron (green vitriol), and that the product of decomposition of the arsenides and sulphides is more to be dreaded than these metallic substances themselves. A more common cause of "flouring," however, is due to the action of the sulphate of iron.

The sulphate of copper (blue vitriol) is also an obstacle to amalgamation, and, like the sulphate of iron (Skey believes), forms sub-sulphates of mercury and iron and copper which persistently adhere to the surfaces of the gold and prevents amalgamation. Skey also found by direct experiments that antimony is a metal not readily amalgamated, but he detected antimony in three samples of gold out of four from a certain district, and this metal had communicated something of its negativness to the gold alloy.

Skey also discovered, in the course of his investigations, a hitherto quite unsuspected reason for not getting true chemical contact between the gold and the mercury in the ordinary furnace and the battery; for he detected the fact that the surfaces of native or artificially prepared gold, even of extreme fineness, energetically absorb sulphur, or sulphureted hydrogen; and that when the surfaces of the particles of gold are so affected, they absolutely fail to have contact with the mercury, and are not amalgamatable, but that they may be made so by treating with cyanide of potassium, free chromic acid, chloride of lime, or by raising their temperature to a red heat. There are, however, certain specimens of native gold exceeding pure which show no disposition to amalgamate on contact with mercury; nor does boiling water facilitate it in any degree, although the specimens may be free from any discernible ferruginous or other stain. In many cases the obstacle is sulphur, most probably existing in combination with gold, as an auriferous sulphide. Sulphureted hydrogen is too common a substance, or at least the materials required for its generation are too common, to allow the hope that our native gold has not been more or less affected and rendered to a greater or less extent unamalgamatable.

Metallic Antimony

Has a great affinity for gold, and forms an alloy with it when the two metals are melted together, or when the vapor of antimony is passed over heated gold. This alloy is gray in color and very brittle, and amalgamates with mercury only after long contact and continued grinding; or by heating the two together, and the amalgam when formed floats on the mercury, and gradually gives up metallic antimony as a fine powder when agitated in water. This antimonial powder carries off a quantity of mercury and gold amalgam entangled with it.

Antimonial sulphide is perhaps the worst mineral to "flour" mercury that the miner has to deal with, but antimonial oxide has no effect on mercury or amalgam.

Gold and Arsenic.

Gold, alloyed with arsenic, is difficult to amalgamate, and when alloyed, in proportion of one part arsenic in 1000 parts of gold, the alloy is so brittle that it may be ground to a gray, easily fusible powder. If there be much arsenic present, the amalgam is powdery and black, and floats on the surface of the mercury; the black color is due to the operation of the arsenic, which, at ordinary temperature, does not unite with the mercury, but floats and "flours" the mercury. The arsenic from mispickel, or any of its numerous combinations with iron, cobalt, nickel, silver, copper, manganese, antimony, and with even lead and lime, may be set free in the roasting furnace, and pass through the furnace as a vapor, and be readily taken up by the gold that may be present, and thus prevent the amalgamation of the gold, providing sufficient heat is not then applied to this alloy to break up the later combination. Arsenical pyrites act seemingly in the same way as metallic arsenic with mercury; for when ground together, a large amount of black "floured" mercury is produced; and if

the pyrites is partly decomposed, this action is more energetic than with the original mineral, and amalgamation prevented.

Lead, Iron and Copper.

Metallic lead has a highly detrimental effect upon the amalgamating process, as it causes a loss of gold amalgam and mercury by the lead amalgam arising to the surface of the mercury, as a frothy scum, carrying with it any gold amalgam that may be present, and by coating the mercury and preventing it taking up the gold; besides, this floating lead amalgam is easily carried off in a fine state by a current of water. Although zinc is taken up by gold at a dull red heat and forms a brittle alloy, the combination is easily broken as in arsenic, and the gold amalgamated.

Iron has no effect ordinarily upon amalgamation; but if the mercury contains one per cent of sodium amalgam, it will decompose iron salts and produce iron amalgam, which will float upon the surface of the mercury and be carried off in a current of water, and take with it such gold amalgam as may be entangled with it.

Copper is not injurious to the operations of recovering gold from pyrites, except in reducing the standard of the gold with which it is alloyed; and upon the other hand by becoming amalgamated with mercury, it may assist in collecting the fine particles of gold in the same way as amalgamated plates. In fact, the presence of galena, blende, manganese, arsenic, iron and copper pyrites do not interfere with oxidation while roasting if a proper furnace be used, and the ore properly pulverized before it is roasted. Even tellurium, with its combinations and its alloys, which baffles the efforts of the miner to make the gold amalgamate when it is present, gives way in the roasting furnace; and the gold is denuded of its coating of tellurous acid and rendered easily amalgamatable.

Loss in Furnaces.

There is a great loss of gold in working ore that has not been thoroughly desulphurized in the roasting furnace, and to accomplish this desulphurization the rock should be finely pulverized at the start; for if a large piece of quartz containing pyrites and gold be submitted to a low degree of heat, the pyrites in the interior of the quartz is but little changed; while the free gold is coated with a film of some material, probably sulphur, which impedes the action of the mercury. At a higher degree of heat the oxide of iron forms on the exposed faces of the quartz, and acts as a flux, and glazes the surface of the quartz with a slag; in this glazing of slag or glass, minute globules of gold may be discerned, and in the black veins, running through the partially desulphurized quartz, will be found the melted mono-sulphide of iron, in which is a diffused portion of the melted gold, but in a form more difficult to separate than before the rock was roasted. If the quartz is heated to a high degree of heat, and suddenly thrown into cold water, it is rendered more friable and soft, and the gold changed in form, from the jagged or laminated to a spherical shape, and enabled to sink more quickly to the mercury; but outside of this there is no advantage to be gained by the cold bath. To avoid the loss attendant upon incomplete desulphurization, and secure complete and rapid oxidation of the ore, it is found necessary to crush the ore dry, to a uniform fineness, of from 1-40 to 1-60 of an inch in diameter, and roast it afterward, although, owing to the faulty construction of the furnaces, and the great loss of fine gold in being carried off by the draft in the flue, the ore has usually been coarse when roasted, especially as hitherto it has been thought that the construction of the furnace has had but little influence on the chemical results of roasting. Economy of fuel and the mechanical devices for stirring the ore have been of more interest to mine-owners than a study of the chemical combinations produced by admitting the gases and flame of the fuel to come into contact with the ore while roasting. The loss of fine gold in the flue has created more mental disturbance to the average furnace-man than the loss of gold caused by the forming of new bases and the coating of the gold by alloys formed in the furnace, for the reason that it has been better understood and more easily guarded against.

The Russell Furnace.

A furnace has been invented, and recently patented, by Dr. E. F. Russell, of San Francisco, that admits of no loss of gold, by either chemical combinations from the contact of the flame and the ore or from having gold carried off in the flue. The ore is roasted by radiated heat, and the gases and flame from the combustion of the fuel are absolutely prevented from coming in contact with the ore; the draft of the flue does not touch the ore, and there can be no loss of fine gold from that cause.

This Russell furnace is constructed in such a manner that from 5 to 20 chambers (made of fire-brick) cross it from side to side, and the open ends of these chambers are closed by doors from the outside. Each of these chambers gives a floor surface of 24x96 inches, and will take a charge of from 250 to 500 pounds, dependent upon the character of the ore. In the arched top of each chamber are escape-holes for the gases given off by the pyrites in the course of roasting. If the ore be heavily charged with sulphurets, and placed in the roasting chamber, it furnishes means within itself to materially assist in the oxidation; for the pure atmospheric air, coming through the not over-tight doors (at the open ends of the

chamber), is brought in contact with the mixed gases given off while the ore is being roasted, and furnishes all the conditions for the rapid combustion of the sulphur. The excess of gases passes through the escape-holes into the flue and is condensed in their passage to, or in, the large combustion chamber, constructed at the rear of the furnace. If it is found that it is advisable to save any volatilized minerals present in these chambers, they can be drawn to condensing tanks and there saved. The flame passes above, below and all around these roasting chambers, but never into them. The inventor took advantage of the fact that "nature abhors a vacuum," and thus secured a most remarkable draft for this furnace. He placed a large combustion chamber at the rear of the furnace and made the exit for the flame a few inches below the level of the grate-bars, in the fire-box, at the front of the furnace. The practical results were dual, for it not only banked the heat against the rear of the furnace and made these back chambers almost as hot as those situated near the fire-box, but the superheated air, rushing from the combustion chamber into the stack, created a vacuum which nature could only fill, by forcing cool air (under atmospheric pressure), through the grate-bars and fire-box. Through this unique construction of the Russell furnace, the fuel is fully utilized and the gases consumed; and it is claimed by the inventor that a saving of 60 per cent is made in fuel over any other furnace that is used to roast ore upon a large scale.

The Action of this Furnace

Seems to be simply as follows, viz.: As the ore in the charged roasting chambers begins to roast at a low heat, the sulphur of the pyrites is set free, and combines with the oxygen of the air to form volatile sulphuric acid gas; and the metals, by losing part of their sulphur, are converted into oxides and sulphates; as the heat is increased, the sulphates are changed into oxides. Arsenious acid and sulphuric acid escape with such metals as have become volatilized under the action of the intense heat and oxygen, and all metallic iron is converted into an oxide. As no gas nor flame from the combustion of the fuel is permitted to come in contact with the ore when undergoing these rapid changes, it is not fluxed, slagged or matted, and no new base is formed, and the whole mass is soon thoroughly oxidized. After the sulphur and arsenic have been thrown off (provided salt has not been used), the gold remains free, and may be washed out.

When salt has been used below a red heat, the chloride of gold is made, but above that point it is converted again into metallic gold. Technically speaking, the arsenic is converted into arsenious oxide (As_2O_3); the sulphur into sulphur dioxide (SO_2); and the iron into ferric oxide (Fe_2O_3).

It may be readily seen that in such a furnace the sulphur and arsenic in the pyrites take fire, and are converted into dioxide and arsenious oxide at the expense of atmospheric oxygen, and pass away together through the escape-holes in the arched top of the roasting chambers into the flue.

With this knowledge before us, we may summarize in a few words the necessary requirements to extract gold from refractory ore, and successfully amalgamate the gold and silver. Summary: Pass the ore through a rock-breaker, and over a drying floor, and then crush it dry, and pass it through a screen of 40 mesh to the inch, and then roast it in a Russell furnace, and thoroughly oxidize all the minerals in it, as the oxides do not interfere with the action of the mercury. Pass this desulphurized material into an ordinary combination pan, and grind it a short time and amalgamate the precious metals, and then run the pulp into settlers and save the amalgam and re-tort it.

This process is a remedy complete in its action for the loss of gold in the battery, (when the ore is wet crushed) and by non-amalgamation, after roasting in the ordinary furnaces in use. And if the different steps of the work be faithfully done, the result will prove as satisfactory to the mine-owner as his assay of the ore from the mine.

Oakland, Alameda Co. E. T. BARBER.

SANTA ROSA TO BENICIA.—George W. Walts, formerly of the Union Pacific, has secured the contract for the construction and thorough equipment of the proposed Santa Rosa & Benicia Central Railway. The new line is one which the farmers and fruit-growers of the Sonoma valley have been working for during the past year, and is intended as a "short cut" for the shipment of their products to the Eastern market. Beginning at Santa Rosa, the route surveyed runs to Glen Ellen, at the northern terminus of the Sonoma valley line, and thence to Sonoma. It will then pass southeasterly into Napa county, and continuing in the same direction, will go through the town of Vallejo, and on to Benicia, where it will connect with the Central Pacific. Mr. Walts left the city for Santa Rosa last week, and on Monday morning, with an engineering corps of which Lyman Bridges is chief, he proceeded to locate the line of the route. The work of construction was also commenced on the same day, a force of graders and track-layers having already been engaged. The cost of the line with its equipment is estimated at \$2,000,000. It is the intention of the contractor to have the new railway completed and in running order this year.

Saving Floured Quicksilver.

Results of the Tests of the Rae Process.

From the Dayton News Reporter we take the following interesting description of the recent tests of the Rae process, at the Douglass mill, of which we have spoken several times of late:

The Rae electric process has received a thorough practical test, and has been proved a grand success. It has been demonstrated beyond a doubt that by means of that process tailings and low-grade ores which before could not be worked except at a loss can now be worked at a profit. The result will be of almost incalculable value to the mining industry, and to this section of the country it will be especially beneficial. The time is not far distant when the process will be used in all reduction works. Below will be found Supt. Rullison's report of the test recently made at the Douglass mill:

Upon the 8th day of February we commenced running three pans and settlers with Dr. Rae's electric attachment and one pan and settler in the old method (without electricity), first having taken all four of the pans and settlers to pieces and thoroughly cleaning them. We run the mill on those pans and settlers alone, stopping all the other work, in order to be certain to not get anything mixed. We selected our best workmen, and all the quicksilver used was carefully weighed out for each system separately.

Dr. Rae, after adjusting the brushes on the dynamo, placed the test in my charge, saying: "Give me a fair, just and honest deal." Some of the men were very skeptical, but all worked for a fair test. Upon the start, No. 1 pan and settler were used the first two days on "green slimes" and "slums" that had never been plowed or scraped, and no sand having been mixed with them. With Nos. 2, 3 and 4 the regular prepared slimes and slums, with sand, were worked. Nos. 1, 2 and 3 were the pans and settlers connected with the electric system. No. 4 was run in the old way.

After running four charges of the "green slimes" and "slums" through No. 1 pan and settler all these, we found that, to all appearances, the electricity worked equally as well on the "green" stuff as upon the prepared material. Assays were taken from each settler as soon as it was filled, and also when the settlers were discharged. These assays showed a large percentage of saving of bullion by the electric settlers over settler No. 4, the old method. After the first day the assays from the settlers, taken when first filled, showed a marked decrease in value in comparison with settler No. 4, thus proving that the action of the electricity was affecting the bulk of quicksilver, rendering amalgamation more perfect in the pans.

The quicksilver returned from the settlers Nos. 1, 2 and 3 was bright, lively and healthy, apparently free from iron and scum.

I would remark that on the fourth day the No. 4 settler showed that it was being benefited by the others. This was easily traced to the ground currents from Nos. 1, 2 and 3 settlers.

During the seven days' run, pannings were made from all the settlers, which showed the superiority of the new method.

The sluice-boxes were so arranged that two sluices were given exclusively to Nos. 1, 2 and 3 settlers, and two sluices to No. 4 settler. A daily examination of sluices after each draw-off, exhibited the fact of the success; while scarcely a trace of floured quicksilver could be noticed on the Rae sluices, the No. 4 sluices showed plenty as usual.

During the run, 1672 pounds of quicksilver was used in Nos. 1, 2 and 3 settlers on 52 tons of material worked, and 1655 pounds was returned back, showing a loss of 17 pounds, or about five ounces to the ton. No. 4 used 650 pounds of quicksilver on 17 tons, and 616 pounds was returned back, showing a loss of 34 pounds, or two pounds to the ton.

Strict attention was paid to assaying the pulp, as delivered from the pans to the settlers, and when the settlers were discharged. The bullion returns were as follows:

	Old Method.	Rae Method.
No. of tons.....	17	52
Ounces of bullion.....	611.50	1219.80
Fineness.....	62-1000	115-1000
Value.....	\$41.09	\$181.38
Increase of bullion production, per cent.....	.....	47.11
Increase of fineness of bullion.....	.....	63-1000
Fineness of gold returned.....	3-1000	4-1000
Gain on returns of gold, per cent.....	.....	33.33
Saving of quicksilver, per cent.....	.....	83.33

This test was made by daylight, in order to guard against any mistakes that might occur during the night, and also to make it possible to give it my personal attention.

In conclusion I unhesitatingly pronounce the trial a most perfect and emphatic success.

WM. A. RULLISON,
Superintendent and Assayer of J. M. Douglass & Co.'s Mill.
Dayton, Nevada, Feb. 21, 1887.

A SCIENTIFIC CURIOSITY.—One of the curiosities of light and heat is the fact that rays of the sun should pass through a cake of ice without melting it at all, as is the case when the thermometer stands a little above zero. That the rays of heat actually penetrate the ice is shown by the fact that a lens of ice may be used for setting fire to inflammable substances.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SPECTACLE-FRAME.—Wm. R. Johnston, S. F. No. 357,392. Dated Feb. 8, 1887. The invention consists in the novel means for adjusting the frames to any size of glasses and securing them. The object of the invention is to provide a simple, practical and finished means for adapting the frames to receive the different sizes of glasses, which means are of such a character as may be readily operated as well by those unfamiliar with the manufacture of spectacles and eyeglasses as by those who are familiar.

WATCH-CASE.—Julius C. Landmann, Eureka, Nev. No. 357,395. Dated Feb. 8, 1887. This case is more especially designed to protect the movement of the watch from injury should it be dropped. It consists of an interior inclosing case for the movement, this case being of smaller diameter than the ordinary exterior case, so as to admit a spring between the two, by which any accidental jar upon the exterior case will be prevented from acting violently upon the movement.

BALANCED SLIDE-VALVE.—Andrew J. Stevens, Sacramento. No. 357,424. Dated Feb. 8, 1887. This invention consists of a valve sliding upon the valve-seat, and having, in addition to the usual steam exhaust cavity or cavities, an auxiliary passage passing through it for the steam supply and exhaust purposes, according to the position of the valve, and, in connection with this valve, of a shield or balance-plate and an oval balance-ring fitting between the upper side of the valve and balance-plate. The patent also covers certain details of construction.

EVAPORATOR.—Wm. F. Lambert, S. F. No. 357,775. Dated Feb. 15, 1887. This improvement in evaporator consists of furnaces for heating the air, means for conveying it to the chamber where the drying is to take place, and applying it to the hollow shelves, supporting the material to be dried or evaporated, a device for regulating the temperature of the air before it is admitted to the chamber, and a means for returning the air again before it has passed through the chamber to be again reheated. Certain details of construction are also covered by the patent.

ADJUSTMENT FOR HARVESTER REELS.—Joseph Gilbert, Los Angeles. No. 357,822. Dated Feb. 15, 1887. This patent covers a mechanism for adjusting harvester reels for use in high or low grain. By the construction adopted the reel is within easy reach of the driver, and it may be changed at any time to suit the character of the work to be done. Its movement is much greater than when the ordinary crank arms are used for raising and lowering it, and the arc of a circle through which the rear end of the lever moves is not great enough to interfere with the movements of the chain around the pulleys.

HOEING AND RAKING MACHINE.—David Lubin, Sacramento. No. 357,841. Dated Feb. 15, 1887. This is an apparatus for working and cultivating the soil. It consists of a series of arms, carrying at their outer ends blades or hoes, and a mechanism by which these arms are raised and caused to strike on the ground forcibly in the manner of a hand-hoe, and be moved backward at the same time, so as to move and cover up that portion of the soil which they have cut off. This device is mounted upon a wheeled carriage so as to be drawn over the ground; and in connection with these hoes is a mechanism for operating them.

FILTER.—Anthony McLean and Findlay Camming, S. F. No. 357,402. Dated Feb. 8, 1887. This is a filter to be attached to ordinary pipes or faucets for the purpose of clearing water to be used for household or other purposes, from the larger and heavier impurities. It consists of a means for readily cleaning the exterior of the cylindrical filtering column which is employed in the device. This is a band, or series of bands, suitably united, surrounding the filtering column, which it fits sufficient to rub upon the outside. It is provided with a rod or handle by which it may be moved up or down whenever it is desired to cleanse the surface.

SPRINKLER.—Wm. Wainwright, S. F. No. 357,799. Dated Feb. 15, 1887. This is a sprinkler for hose nozzles. It is so made that the stream emerging from the nozzle-top strikes a plate or flange at a suitable angle, and is thereby broken up and spread out in the form of a spray or sprinkle. The angle at which the stream meets the plate or flange may be varied by the adjustment of the latter. The limits of this adjustment are determined by a thumb nut and lever or handle. The flange may have its angle varied rapidly by means of the thumb of the person operating it, and said plate may, if desired, be thrown back at will out of the way, to permit the unobstructed play of the stream.

VAPOR-BURNER.—Wm. Wainwright, S. F. No. 357,798. Dated Feb. 15, 1887. This in-

vention relates to the class of burners which are used for burning the vapor arising from the lighter or more volatile oils, such as gasoline, naphtha, etc. The patent covers the construction and combination of devices. The adjustment to regulate the amount of flame desired is accomplished by increasing or decreasing the distance between the point of ignition and the top of the wick. Thus, when the burner is moved down a greater heat is thereby obtained, which generates more vapor, and causes an increase in the body of the flame, and when the burner-tube is raised there is less heat and consequently less vapor generated, and the size of the flame is thereby reduced.

PHOTOGRAPHIC CAMERA.—Oliver Hyde, Valjeo. No. 356,941. Dated Feb. 1, 1887. This camera consists of a case having three horizontal compartments, the central one of which contains the lens, plateholder, and bellows for observation; the upper compartment containing a magazine for plates, and the lower compartment another magazine for the reception of the plates after the picture has been taken, and, in combination with this, a mechanism operated from the exterior of the case whereby the focus is adjusted and the magazines moved so as to adjust the plates in position for pictures to be taken, and remove them into this receiver below without opening the box at all.

HARROW.—David Lubin, Sacramento. No. 357,151. Dated Feb. 1, 1887. This improvement in harrows consists of a combination with the harrows having fixed teeth, of one or more series of radial spoked wheels mounted upon an axle or axles extending across the harrow frame, so that the wheels may rotate between the lines of the harrow teeth. This construction resembles in some of its features the arrangement shown in former applications by the same inventor, but it differs essentially from those in being made applicable to an ordinary harrow composed of longitudinal and transverse frames with a series of fixed teeth, and by the arrangement for combining the rotary spoked wheels and lifting fingers with the same.

CLOD CRUSHER.—David Lubin, Sacramento. No. 357,844. Dated Feb. 15, 1887. This consists of a series of disks, either plane or toothed, mounted upon a horizontal axle, and, in combination with these, of a series of arms or fingers projecting down in front of or behind the vertical plane of the axle, so that their points will enter the ground and at the same time serve in connection with the teeth or edges of the disks to crush and break the clods which may be taken up by these fingers. Connected with these fingers is a mechanism, either automatic or otherwise, by which the teeth may be raised out of the ground or disengaged, so as to clear them of stones, trash, or other obstructions, which may be picked up as the machine travels, and afterward returned to the working position.

CLOD CRUSHER.—David Lubin, Sacramento. No. 357,843. Dated Feb. 15, 1887. This is another improved device for breaking or disintegrating clods or masses of earth, and working or reducing the same. It consists of a series of disks or rollers, which may be fastened solid to the shaft, or may be arranged to work independently, having their peripheries provided with teeth or points which will enter the ground, or formed with a sharp edge or edges, which will act as a cutter or crusher, and, in connection with these, of a series of arms projecting from between the disks and fulcrumed upon the axle or shaft of the frame, so that they may be turned to present their points toward the front or direction in which the machine is traveling, or may be reversed, so that the curved points will enter the ground and be drawn along in this position following the disks or rollers, and acting as a harrow, leveler or cultivator, and to cover seed.

CLIP FOR WIRE-ROPE WAYS.—A. S. Hallidie, S. F. No. 357,664. Dated Feb. 15, 1887. This invention relates to a means for attaching the conveyor or carrier of an endless-wire ropeway to the traveling wire rope, the same being employed as an aerial ropeway. It consists of a clip formed by inserting a short bar or shank within the rope in place of the central core, and a thin plate secured to said bar and extending outward through the space between two strands and reinforced or strengthened so that the bucket or conveyor may be attached to this plate and suspended from the rope. This invention is designed to be used in connection with what are known as aerial ropeways, and it is designed to take the place of the band connection or clamp which has hitherto been used to attach the hanger, by which the bucket or carrier is supported, to the traveling rope.

CLOD CRUSHER.—David Lubin, Sacramento. No. 357,842. Dated Feb. 15, 1887. This clod crusher consists of a series of adjustable arms or lifters supported from a suitable fulcrum or an axle, which is journaled on a suitable frame-work, and, in combination with these arms or lifters, of a series of independent disks or wheels, having arms or teeth projecting from their peripheries, these disks turning about a shaft or axle extending across the frame and moving between the arms, so that any lumps or clods which are brought up by the arms will be broken by the action of the teeth striking against the clods, which are expounded temporarily by the bars upon each side while the

teeth pass between them. In connection with this, the inventor shows in his patent the preliminary cultivator and levers, by which the cultivator may be raised or depressed, and also by which the lifting arms may be raised or depressed.

WATER-WHEEL BUCKET.—Louie Biggio, Sutter Creek, Amador Co. No. 356,977. Dated Feb. 1, 1887. This invention relates to that class of water-wheels which are operated by means of the impact of a stream of water issuing from a nozzle under head or pressure against suitably formed buckets secured to the rim or periphery of the wheel, said wheel being usually known by the name of burly gurdy. The patent covers "a water-wheel bucket, the cavity or face of which is provided with a central perpendicular ridge extending from the base upwardly part way of the height of the bucket, said ridge being wider at the bottom than at its top, and having its apex tapering and gently curved for receiving the impact of the stream, and lateral tapering ridges extending from the top part way down and on each side of the central ridge." Concentric corrugations are formed in the depressions on each side of the base of the central ridge.

FOG-HORN.—George White, S. F., assignor of one-half to E. H. Backnam, S. F. No. 357,802. Dated Feb. 15, 1887. This fog-horn is designed for use on vessels in foggy weather. It consists of a chamber having a mouthpiece at one end, an organ or other reed adjustably fitted to the opposite end, and an intermediate chamber or chambers with tortuous passages and screen openings through which the air reaches the reed from the mouthpiece, and in connection with this of a secondary perforated chamber, which may be filled with epaço or other porous moisture-absorbing material. In the construction of horns of this class it is usual to fix a reed directly inside the mouthpiece, and a reed thus placed is subjected to the action of a great amount of moisture from the breath, which is apt to corrode, and is also very apt to become clogged on account of the propensity of sailors to chew tobacco, particles of which become blown into the reed, thus preventing its action. In order to protect the reed from these difficulties, this inventor places it in a chamber situated at a considerable distance from the mouthpiece.

PROGRAM ALARM CLOCK.—Ellen Cushing, S. F. No. 357,373. Dated Feb. 8, 1887. This invention consists in connection with the clock-work mechanism which operates the hands and the alarm, of a rotating drum, wheel, ring or band, provided with removable or adjustable pins adapted to successively come in contact with a mechanism by which the alarm is rung. More particularly the invention consists in a drum having an hourly period of rotation and provided with holes or sockets arranged in rows in horizontal and vertical planes, removable pins fitted to these holes, a pivoted standard, by the partial rotation of which the alarm is operated, a sliding sleeve on said standard, and carrying an arm with which the pins of the rotating drum successively come in contact, whereby the standard is partially rotated, came on the drum for hourly raising the arm of the sleeve into position for the engagement of the pins of each row, a means for throwing the alarm out of action and bringing it into operation again, and various details of operation. The object of the invention is to provide a clock which is capable of sounding a number of successive alarms during any given period, said alarms taking place at equal, or at unequal or irregular intervals, as may be desired. It is especially adapted for use in school-rooms, where the hours are divided into stated periods for accomplishing certain work. These periods are ordinarily defined by a hand-bell operated by the teacher or by some monitor appointed for this purpose. The limits of the periods are therefore liable to be inaccurate; but with this improved clock this difficulty is obviated, and the burden and responsibility are removed from the authority having the regulation of the time.

THE COOS BAY COAL MINERS' STRIKE.—In regard to the strike of the Coos Bay coal miners, the manager of the company in this city says that about six weeks ago they concluded to advance the price of their coal in this city to wholesalers from \$5 to \$5.50 per ton. The miners at Coos Bay thereupon demanded that the 50 cent increase be divided with them and demanded \$1.25 a ton for all they got out. On being refused, the men, 90 in number, went out on a strike. The price of the coal since the strike has been put back to the original price of \$5. The company has not determined whether it will resume work at the mine or shut down for good. They claim expenses are high and profits small. The miners at the price paid, \$1 a ton, can easily make, they claim, \$4 a day.

A MINING SUIT DECIDED.—The Supreme Court has confirmed the judgment of the lower court in favor of the plaintiffs in the case of William Tredinnick and 29 others against the Red Cloud Consolidated Mining Co. The suit was to enforce liens for labor everlastingly performed by the plaintiffs upon a mining claim in Mono county. Henry Wadsworth was joined as a defendant in the action, because he had a judgment lien against the mine, which, it is alleged by the plaintiffs, was subsequent and subordinate to their liens.

El Dorado's Mineral Resources.

It is well known that El Dorado county was for a number of years, says the Placerville Observer, the banner placer diggings county; her product of gold running up into millions upon millions annually. These rich diggings were not confined to any special locality, but extended clear across the county, and the belt in width ranged from 20 to 40 miles. In those days nothing but surface and river diggings were known, and when the claim had been partially worked off, so that a miner with the crude facilities then in vogue could not make over \$10 or \$15 a day, the claim was abandoned and fresher and more inviting fields sought. Later on these abandoned claims were relocated and worked as long as they would pay from \$6 to \$10 per day, and then sold or abandoned again. Later on these were again relocated and with improved methods and appliances were made to yield handsomely, and so it has gone on up to the present day, until there is now very little surface ground left that can be profitably worked. But we have yet unlimited deep gravel deposits that are rich in gold, as well as untold rich quartz veins, which have already been made to give up many millions of treasure.

Albeit many of our best quartz mines have been sadly mismanaged, and a great deal of money needlessly squandered by incompetent superintendents and managers. As it is, we have to-day but few good-paying mines, and they are in the hands of private individuals or close corporations, and little is said or known about them beyond the knowledge that they are good-paying properties.

We have a number of partially developed quartz mines, that for the work done promise well, and good round prices are asked for them, while the development is not sufficient, as a rule, to warrant the prices demanded. We have plenty of good miners in our midst, capable of taking hold and superintending any kind of a mine, and who are capable of making economical and practical tests of mines, and if capitalists would, instead of paying high prices for shafts and tunnels, with indifferent prospects, purchase a few undeveloped or partially prospected mines, or bond them, have them economically and intelligently tested by our practical miners, instead of sending some impractical squirt, with Colonel or General prefixed to his name, from New York or Boston or some other seaport, who never saw the working of a mine until his arrival here, to superintend them and fool away the money intended for legitimate work, they would be sure to get an occasional good mine at much less expense than has been their usual experience.

Grizzly Flat, some 20 miles east of Placerville, is to-day a more promising field for the judicious investment of capital in legitimate mining than can be found in the same extent of territory anywhere else in the State. And the same can be said in regard to El Dorado and Georgetown, and but two or three years, at most, can elapse, even with present rate of progress, before capitalists will be astonished that they did not sooner recognize the wealth of these localities, and secure a goodly share when it could be had at nominal figures. Of course every prospect-hole does not constitute a mine, but good mines are discovered by first sinking prospect-holes, and developing only those that prospect well; but, unfortunately, too much money has been heretofore lavished upon insignificant prospects, all over the county, in some instances with a view to catching greenhorns and realizing handsomely, which in a number of instances has proved a success, but to the detriment of our best mining interests. But this matter is becoming better understood, and we are confident that it will not be long before a tide will set in that will fully demonstrate the fact that we have as good quartz mines, and more of them, than are to be found anywhere in the world.

In the immediate vicinity of Placerville, at no distant day, a dozen good quartz and gravel mines will be developed and operated, which, together with the deep gravel belt in its entire extent, will give employment to at least 1000 miners.

In the vicinity of Georgetown and Greenwood, and all over the north side of the county, is as fair a field for the development of good mines as is to be met with anywhere on the coast, and the same can be said of all that portion of our county south west from Placerville, in the immediate vicinity of Diamond Springs, Nashville, El Dorado, Shingle Springs and Clarksville, and in fact we know of no section of the county where good prospects in quartz mining cannot be found; but considerable capital, hard work and good judgment are required to open them up, and this is necessary in any enterprise of similar magnitude. These interests are yet really in their infancy, but can remain so but a short time now, as the fact is becoming so generally known that what we have claimed for years is a veritable fact, that our mineral belt is teeming with hidden treasure. The enormous quantities already secured, the good and permanent mines now developed and working in all directions, and the large extent of country open to prospect and development, all clearly point in this direction.

Had the capital been employed here that was put into the Black Hills, in Leadville or Tombstone, the results there would appear insignificant compared with the results that might have been, and will be, achieved here.



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SAN FRANCISCO:

Saturday Morning, March 5, 1887.

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Passing Events.

The ditches bringing water to the Grass Valley mines are again open, so that mining operations are once more in progress. The ditches became blocked with snow, and for some three weeks several mines have been idle.

A great many immigrants and tourists continue to come to California, and lands, especially in the southern part of the State, are being rapidly settled up. Real estate is advancing in price in many of the interior towns, and general prosperity prevails.

It is now thought that with late spring rains California will have one of her most prosperous seasons this year. The rains which have fallen of late have been warm, and heavy crops are expected all over the State.

It is thought that there will be renewed vigor in the working of quartz mines in California this summer. Many old ones will be reopened and a good many prospectors will be on foot. Mines that not many years ago were considered worthless can now be made to pay. We have more experience, better appliances and better conditions for working than formerly.

There is a rumor in this city that the Providence mine, Nevada county, has been sold in London for \$1,400,000. The sale of this mine has been pending for some time in the London market. Whether the rumor of this sale is correct or not, we are unable to state.

CHIEF JUSTICE MORRISON, of the Supreme Court of California, and Samuel Bell McKee, who was until a short time since one of the Supreme judges, both died this week.

Celestial Photography.

Just at present celestial photography is attracting much attention among astronomers. It is one of the most important of the many methods used to further our knowledge of astronomy. The Lick telescope is to be provided with an extra lens to correct the great objective for the photographic rays, and when complete, it will stand without a rival worthy of the name. Prof. Holden has intimated that at least a part of the time of the great telescope will be devoted to this comparatively new method of observation.

The first successful attempt to photograph a heavenly body was made by Dr. J. W. Draper, in the State of New York, in 1840, when he succeeded in photographing, or rather daguerreotyping, the moon. Bond, of Cambridge, 10 years later, also succeeded in obtaining an image of this moon by the same process, but nothing of any great value was accomplished for another decade. In 1864, Dr. Rutherford, of New York, photographed the moon with such success that the photographs, even at this time, are the best extant, and are being sold for the benefit of the Bellevue Hospital, in New-York City.

While the American astronomers claim the honor of originating this new and now powerful aid to astronomy, France and England are leading the world in this particular method of research. The Henry brothers, of Paris, have thus far obtained the most marvelous results, with perhaps the single exception of Mr. A. A. Common, of England, who succeeded in obtaining a wonderfully correct picture of the great nebula in Orion. The instrument used by Mr. Common is a silvered glass mirror of 36 inches aperture, while the telescope used by the Henry brothers is of 13 inches aperture, and was constructed by themselves for this special work.

One of the greatest obstacles to be overcome in this new method of astronomical science was purely a mechanical one. The most sensitive photographic plates require an exposure of about an hour for faint objects, and the difficulty of keeping the telescope moving at the exact rate that would just counteract the diurnal motion of the earth, and keeping the telescope pointed at precisely the same part of the sky for this length of time, requires the most elaborate mechanism. To illustrate this difficulty, it may be said that the image on the photographic plate of one of these very faint stars is only about 1-1000 of an inch in diameter. To obtain the image of these faint points of light, it is sometimes necessary to give an exposure of 1½ hours, and the motion of the telescopes must be uniform in "following" the star, that the motion must not vary even the 1-1000 of an inch, or a star giving such a faint light would not or could not be photographed at all.

Just here is the great secret of the success of this new method. The photographic plate may be exposed steadily for an hour or more, and the light of a star, so faint that it would never be perceptible to the eye, will register itself upon the abnormally sensitive plates now in use, and thereby bring to our knowledge the existence of millions of stars that could never be seen with the instrumental aid we have at present. Of course the exposure necessary to photograph a star varies with the brightness, and, in some measure, the strength of the actinic rays of the star. It has been estimated that the bright stars Sirius and Vega can be photographed in the 1-200 part of a second with a 13-inch telescope.

The actual results obtained are of the most astonishing character; and only those who are familiar with the subject can fully appreciate them. It is said the eminent astronomer, Wolf, worked several years to construct a chart of the little cluster known as the Pleiades—familiarily known as the "seven stars"—and he succeeded in mapping 671 stars down to the 13th magnitude. This cluster was photographed in the same observatory, the photograph being on the same scale as the chart, and, although the photograph required but an hour's exposure, it exhibited 1421 stars down to the 16th magnitude, and the telescope used for photographing the cluster was much smaller than the one used in making the chart.

The planets have also been photographed. The planet Neptune, and his satellite in different parts of its orbit, were photographed, while the larger observing instruments of the same observatory would not show it at all.

While the Paris photographs of certain regions showed an average of 55 stars to the square inch, the more recent negatives of the same regions obtained by Mr. Isaac Roberts, with a 20-inch reflector, showed an average of 91 stars in the same area, the scale being the same.

What may we expect with the giant 36-inch lens of the Lick telescope? He would indeed be a bold astronomer who would dare set the bounds to which this powerful instrument can penetrate. It will now be only a few months until the Lick Observatory will be in full working order, and until then we must possess our souls in patience.

There is Ever a Famine of Gold.

We hear a good deal just now about the present being an era of overproduction—the markets of the world being glutted with many of the staples of use and subsistence. There is being manufactured or otherwise produced, we are told, more of these commodities than can be consumed, or at least profitably disposed of. We mine too much coal, iron, lead and copper; make too much pork, lard, tobacco and whisky; raise too much farm produce, and manufacture too many articles of various kinds. Such is the plaint of the political economist of the day, and he may be right; but there is one thing, we can assure him, of which we do not make an overproduction, nor yet make half enough. No one complains that the crop of gold is, or ever has been, too large for the wants of mankind. There is, in fact, and ever has been, a dearth of this metal. It is the one thing that everybody wants and of which no one ever gets enough—the one thing that is never without a market at a fixed and remunerative price. Of silver there may, in the estimation of some, seem to be a plethora, but of this, the more royal metal, there is never by any supposed to be a surplus.

Now, while the population and the industrial products of the world have of late years been rapidly increasing, it is notoriously the case that the gold supply has at the same time been growing less year by year. That is to say, with a steadily diminishing supply of that metal the demand for it has at about the same ratio increased. Gold being the measure of values, if gold becomes scarce values decline. When values decline business becomes dull and markets stagnant, a condition of things that must inevitably ensue if the world's supply of gold is not soon augmented. A general shrinkage of prices tends to discourage enterprise, whereas advancing prices tend to stimulate and quicken it. As evidence of this truth we have the results that followed the discovery of gold in California, an event that produced a degree of commercial and industrial activity such as the world has never before seen.

As a means of averting the decadence that threatens the prosperity now so generally prevailing, the arduous resources of this and all other gold-bearing countries, wherein the conditions for utilizing this class of deposits are, as here, especially favorable, should meet with early and extensive development. Concerning the gold mines of California, their number, wealth and situation, investors are everywhere so well informed that we need not here enlarge on that point, further than to say the present annual production of these mines, amounting now to about \$16,000,000, might easily be doubled. The yearly output of our gold mines might, with proper effort, be advanced in the next decade to \$35,000,000 or \$40,000,000, and our men of large means will be consulting their own interests if they proceed to adopt measures looking to that end. Of the quartz mines in this State that might well attract the attention of capitalists, not one in ten has ever been thoroughly explored or equipped with plant. Of this class of properties that have been brought into a productive condition, nearly all are making satisfactory net earnings, not more than a few failures having occurred in this State for several years past. The odium that attaches to the business grew out of transatlantic concommated years ago, and not out of those of recent date. Gold mining, as now conducted in California, is as little tainted with fraud, and in every way fully as safe, as any other branch of business pursued either here or elsewhere.

The Italian earthquakes caused more death, suffering and damage than was at first supposed.

Steam Vessel Regulations.

As heretofore noted in these columns, at the recent session of supervising inspectors, a regulation was adopted requiring test pieces to be attached to every plate used in boiler manufacture. It is now learned that the Secretary of the Treasury refused to approve this, a fact that boiler-makers will be glad to learn. It would not, in any event, have had the desired effect, and would have been of annoyance to boiler-makers.

The Treasury Department has issued a circular, which states that, excepting in the case of a person who has had experience as a locomotive engineer or the driver of a stationary engine, no one can hereafter be appointed chief or assistant engineer without having first served three years in a subordinate position. Where these exceptions are noted, one year's service as subordinate will suffice.

Authority is given to the local inspectors to compel the use of lock-up safety valves on the boilers of any steamer whose captain or engineer is suspected of carrying more than the prescribed steam pressure on the boilers.

An important change in relation to pilots is as follows:

SECTION 24. Masters and pilots of steamers on lakes and seaboard are required to have their wheel chains move so that the wheel and helm shall move in the same direction, so that when the wheel is put to starboard the vessel's head shall go to port, and when the wheel is put to port the vessel's head should go to the starboard.

It is well, in this latter connection, to call attention to the fact that there is confusion concerning the term "helm," some persons thinking it to be the rudder. The wheel is one thing, helm another, and rudder another. The "helm" is really the tiller on the rudder head. By this new rule the wheel moves *with* the helm and throws the vessel's head in the opposite direction.

In yachte and small craft, using a tiller, when the order "starboard" is given, the helm is pushed over to the right, this action pushing the rudder over to the left, and turning the vessel's head to the left. By the new rule just adopted, steamers now do the same thing. That is, at the order "starboard," the wheel is thrown over to the right, carrying also the "helm" (or tiller) to the right, pushing the rudder to the left, and throwing the vessel's head to the left. Under previous rules, when this order was given, exactly the opposite direction was given to the *wheel* on steamers.

Wheels on sailing vessels and all craft generally, all over the world, have for years been worked just opposite to the method enforced by the new regulations. A "ship's wheel" is so rigged that when it is turned to the left, the vessel's head is turned to the left; and when turned to the right, her head is turned to the right. Therefore, when the order "starboard" is given, the helmsman turns the wheel to port, to bring her head to the left; and when the order "port" is given, he turns the wheel to starboard, to turn her head to the right. Of course the order is given for the "helm"—not the "wheel." By the new rule, however, when the officer says "starboard," it means both wheel and helm must go the same way. There will doubtless be accidents and confusion until the new order of things gets working well. Men who all their lives have been used to throw the wheel the reverse direction to the word of order, will find it difficult to overcome the tendency to do so still. The new rule for steamers, nevertheless, is exactly opposite to that in vogue on sailing craft and steamers of other nations the world over. It is probably adopted for the sake of uniformity and clearness, so that the word of command and direction of wheel conform. Some river steamers have long used the new system, and our local ferry-boats have always done so. Now everybody must do it.

BACK NUMBERS WANTED.—In order to complete certain files of the MINING AND SCIENTIFIC PRESS, we should be glad to get certain back numbers. Any one having any of the following numbers of the PRESS will please communicate with this office:

1569—Jan. 2d, 9th, 16th. Feb. 27th. March 20th. April 17th, 24th. May 1st. June 12th, 19th, 26th. 1576—Sept. 11th. 1566—July to December.

It is stated that parties are now at San Diego looking for an eligible location for the erection of smelting works.

Smelting Ores by Electricity.

In a large number of chemical and metallurgical processes, in which high temperatures are required and in which it is impossible on account of the nature of the operation to heat the materials by the direct action of the fire in a reverberatory or blast furnace, it is customary to treat such materials in closed crucibles or retorts. For example, the reduction of sodium, potassium and zinc, and the manufacture of aluminium chloride, are carried on in this way, but the method is troublesome and expensive. The labor of managing a large number of small retorts is alone very laborious. Messrs. Bradley & Crocker, of New York, about a year since devised a process which they sold the patent for to the Cowles Electric Smelting and Aluminium Co., of Cleveland, Ohio. The object of this invention was to overcome these difficulties and to obtain the heat necessary to carry on such operations by concentrating it just where needed, and to obtain higher temperatures than have before been reached in commercial processes. The invention is said to be applicable to a large number of chemical and metallurgical processes.

We have had an engraving made to show one form of the apparatus, representing a vertical, longitudinal section of a furnace; the electrical arrangements are shown diagrammatically.

The apparatus shown in the figure is specially designed to be employed for the reduction of sodium or potassium, and it consists of a hollow cylinder, *K*, made of a material which is a conductor of electricity. This cylinder is set at a slight inclination in brickwork, as shown. On the cylinder are two rings, *L* and *M*, of copper or other suitable metal. These rings fit the cylinder closely so as to make good electrical connection. To these rings are respectively connected two heavy strips of copper, *N* and *O*, which lead to the outside of the furnace. The cylinder, *K*, is provided at each end with covers or caps, *P* and *Q*. In these caps there are holes, *p* and *q*, closed by screw plugs. The door, *Q*, is also fitted with a pipe, *R*, to the end of which a condenser, *S*, is attached. In the brickwork of the furnace there are spaces, *T*, which may be filled with asbestos mineral wire or other suitable non-conductor of heat; or these spaces may be left empty, air being alone a very good insulator of heat.

In working this furnace for the production of sodium, the mixture of sodium carbonate, charcoal and chalk, usually employed in making sodium, is charged into the cylinder, *K*, through the door, *P*. The copper strips, *N* and *O*, are then connected respectively to the poles of a dynamo electric machine, *U*, by large copper conductors, as indicated in the drawing, and a current of electricity is caused to pass along the cylinder, *K*, from the ring, *L*, to the ring, *M*, the current being partly carried by the mixture contained in the cylinder, which mixture is a conductor by virtue of the carbon it contains, and partly by the metal out of which the cylinder, *K*, is made. These rings, *L* and *M*, distribute the current uniformly all around the cylinder. The dynamo, *U*, should be connected to give a current of great "quantity," and the conductors and strips, *N* and *O*, connecting it with the cylinder, *K*, being made of heavy copper have so that the electrical resistance of the iron cylindrical shell, *K*, and of the mixture it contains will constitute the greater portion of the resistance of the circuit, consequently almost all the energy of the current will be converted into heat along the cylinder, *K*, and since it is surrounded by non-conductors of heat, the heat will accumulate, and the temperature gradually rise until the heat consumed in the reduction of the sodium and lost by conduction through the walls of the furnace, equals the heat produced by the passage of the current.

The strength of the current, and consequently the temperature of the cylinder, *K*, may be regulated and maintained at the proper point by means of the switch, *V*, which governs the electro-motive force of the dynamo machine, by varying the resistance of the shunt circuit, which supplies the field-magnets, as shown.

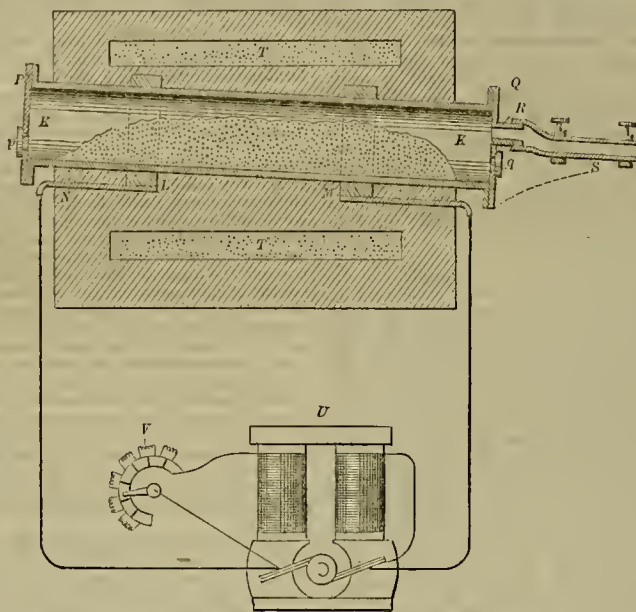
The general method of carrying on the process is the same as in the process now commonly used for making sodium, and the sodium vapor produced by the action of the heat upon the mixture passes out through the pipe, *R*, into the condenser, *S*, of the well-known form

in which it condenses and collects. The temperature and action within the cylinder may be seen by taking out the plug in either of the holes, *p* or *q*. Fresh material is charged into the cylinder at the door, *P*, and residue is taken out through the door, *Q*. The charging and discharging is facilitated by the slope of the cylinder, and the process is continuous.

The temperature can be regulated, and the wrought-iron retorts will last a long time. Various forms of the furnace can be made. In making aluminium-chloride, the cylinder is made of graphite and is placed vertically. Other chemical and metallurgical processes can, it is claimed, be carried on by this invention substantially in the same manner as that described.

The Legislature.

The Stamp Act bill, which provides that each article made in this State shall bear the mark and address of the manufacturer, finally passed both houses, despite the great opposition made to it by manufacturers, on whom it is said to impose useless burdens. It is, of course, directed against the Chinese, but works hardship on all white manufacturers. The Board of Trade, Chamber of Commerce, Manufacturers' Association, as well as large numbers of merchants and other individuals, opposed



FURNACE FOR REDUCING ORES BY ELECTRICITY.

this bill, and a strong effort is being made to induce the Governor to veto it. Most manufacturing establishments in this State are working under difficulties as it is, and it seems impolitic to hamper them in any way.

As stated elsewhere in these columns, the bill appropriating \$60,000 for the support of the State Mining Bureau passed both houses.

The Senate has finally passed the Trademark bill, which provides that any trade union, labor association or organization may adopt and use a trademark and affix it to goods made by members, or to each box or package of said goods. It is also provided that the president or other presiding officer of any trade union, labor association or labor organization, organized and existing in this State, which shall have complied with the provisions of the preceding section, is authorized and empowered to commence and prosecute in his own name any action or proceedings he may deem necessary for the protection of any trademark adopted or in use under the provisions of the Act, or for the protection or enforcement of any rights or powers which may accrue to such trade union, labor association or labor organization by the use or adoption of said trademark.

The Steam-Boiler Inspector bill, which had been passed by the Senate in a modified form, was refused a reading in the Assembly. Notice of reconsideration was given, but it is scarcely possible it will pass this session.

This being the closing week of the session, a great deal of work has been done and many bills passed. A large majority are of little more than general interest to miners or manufacturers. It may be said that the miners were treated to much more consideration this session than they have been of late years. But the manufacturers are not fared well.

The Rae Process.

In another column will be found the results of the trials at the Douglas mill, Nev., with the electric system of preventing flouring of mercury and loss of amalgam, to which we have referred several times of late. The success of the experiments is a general topic of conversation among quartz and tailing millmen, and the *Virginia Chronicle* states that the process will be generally adopted throughout. That paper also says: "Experiments demonstrated that the saving in quicksilver alone equals about \$500 per month to each amalgamating pan, beside increasing the fineness of the bullion contained in the amalgam 50 per cent. The saving at the Douglas mill, where the electrical process has been permanently adopted, is nearly \$8000 per month, making it possible to convert low-grade tailings into bullion at a profit, which by the old method was impracticable."

In addition to what is said in the article on page 154, it may be stated that B. I. Torman, of the Little Bonanza mill, testifies that he watched closely and with great interest the Rae test, as reported by Mr. Rulison, and is thoroughly satisfied that it was an exhaustive test. He is convinced that the test is accurate and reliable.

The following employees of the mill of J. M.

Work for the Mining Bureau.

After a great deal of discussion, the bill appropriating funds for the maintenance of the State Mining Bureau has passed both houses of the Legislature and has gone to the Governor for signature. The amount asked for by the Trustees was \$120,000, which was finally cut down to \$60,000, though at one time it looked as if it would be even less than that. An important amendment to the original bill is that which provides that 50 per cent of the money shall be spent on work in the field.

The fact that this amendment was carried, and that certain opposition to any appropriation was developed, even among mining county representatives, prove what the Press has long maintained concerning the past method of conducting the Bureau. We have always thought that too much attention was paid to the museum feature, and too little to things of more practical value to the mining community. It has always seemed to the editors of this paper that there were many things that miners want to know, which the Bureau could find out for them by more field work, and that the gathering and publication of this information would be better for the Bureau and the miners than the mere collecting and cataloguing of rocks, ores and minerals.

It is pleasant to note that the present State Mineralogist realizes this want. In his report this year, the chapter describing work at certain mines, with tables of results of mining and milling, costs, yield, etc., is the most interesting one printed. There should be more of the same character of information. In the proposed field work, it is to be hoped a thorough investigation and report will be made on the subject of milling gold ores, including systems of amalgamation, concentration, chlorination, etc. It is this class of information that the miners need. If the method employed at one place is better than that of another, let them all know who is doing the best work, and by what means it is done. The present State Mineralogist is perfectly competent to conduct such an investigation personally. In other departments a few skilled assistants may be employed. It is not likely that any one will grumble if three-quarters, instead of the enforced one-half, of the appropriation goes for investigations of this character. The museum is complete and valuable in its way. It can grow more slowly than it has for awhile, without harm, while the efforts of the trustees and mineralogist are directed toward the field work. In this way the Mining Bureau can be of more practical aid to the mining interests than it has been in the past, and, when the time comes for another appropriation, it will be found there will be no such opposition to the institution as developed itself this session. One can hardly blame the members from the interior, if they can see no use for an institution in San Francisco, which they think only maintains a lot of handsome showcases full of specimens, and a number of officials drawing salaries. They want to see some practical results. It is now probable they will see them.

The Impounding Dams.

No bill has attracted more attention during the present session of the Legislature than the Walrath bill, which permits the hydraulic miner to build dams for restraining the debris. It must be said that although there has been a bitter fight against it, the whole subject has been discussed in a fairer spirit than has been the case for some years. A great many hours have been devoted to discussing the matter. On Saturday last the bill passed to engrossment and a third reading in the Senate. There was a hot debate over the bill just previous to the order to engross, and several times it looked as if there would be a fight, with something besides tongues.

The only amendment made was that all the stockholders in the companies to build the proposed dams shall be residents of the State.

The final vote in the Senate, on Wednesday, resulted in passing the bill. The vote was as follows:

Ayes—Abbott, Bowers, Briceland, Byrnes, Caminetti, Conklin, Goncher, Hall, Haynes, Jones, Lenahan, McCarthy, McDonald, Maney, Moffitt, Murphy, Patterson, Pinder, Spellacy, Sullivan, Vrooman, Walrath, White.
Noes—Boggs, Chandler, Clunie, Crandall, Dixon, Dray, Gesford, Hinshaw, Langford, McCudden, Rose, Roth, Sargent, Steele, Wilson, Yell.

MECHANICAL PROGRESS.

Independent Thought in the Shop.

Earnest, independent thought on this part of any boy or young man who has set out to make a mechanic of himself will certainly bring him both knowledge and skill in his chosen calling.

We hear and see statements every little while that as machine-shops gradually grow into manufacturing concerns, the work is systematized until there is nothing but routines in the different classes of work, and a boy apprenticed to one of these establishments "gets no show" in the shop, and is "no good" when his time is out; that a graduate from, say, a steam-pump shop, going to any other shop doing a different class of work must work for small wages, in order to "hold a job," because he cannot take hold of work as it comes along and do it intelligently. He is pictured as being sent out of the shop to make repairs upon a steam engine, or line up a shaft in a brewery, or to fix a hydraulic elevator that is on a strike.

After wasting an hour or two of time, he admits that he is "stuck," and goes crestfallen back to the shop, taking this message to the foreman: "Send up a machinist next time." And then the parties get their work done at some other shop, and refuse to pay for what our pump-man has done, because he did not know what he was about. He actually caused damage by his ignorance. Why is this? He might have been a good man in a pump-shop, but fails immediately on attempting printing press or sewing machine work. He has learned to turn and bore, to plane and slot, to chip, file and scrape, but fails when asked to perform any of these operations on anything except a steam pump. Is it because he has not learned to do these things well, or because he did not use his brains while learning to use his hands?

Machine-shops are always overrun with applicants for apprenticeship. But nine tenths of the applicants for places never think of anything beyond getting into the shop. Of their own fitness for this machinist's trade, they never inquire into. They expect to work three years for a little less pay than they could get shoveling, and then blossom at once into a first-class, well-paid machinist, with no particular mental effort on their part. This result is easy to see. We see it every day in the army of workmen who can do only the commonest kind of skilled work, and oftentimes in only a single branch of the trade of which they call themselves masters.

This I claim is from want of thought on the part of the boy or man himself. The steam-pump man if he has mastered the trade as far as taught in the steam pump shop, has mastered the principles upon which the steam pump operates, and is a competent man to send out to repair a gas engine or a printing press. But this he cannot do without thought, and thought is but another name for study. The study that it takes to master the principles of the steam pump will incidentally bring knowledge of other machinery that cannot fail to be of use some time.

A boy once taught the habit of individual thinking about his work, a place in the front rank of mechanics is sure to be his. Thought will give him confidence and skill, and with these two elements in his mechanical make-up he will prove a valuable man anywhere he is employed, whether they build sawmill machinery or machine tools to build sawmill machinery with.—*American Machinist.*

Working Tension of a Belt.

A number of experiments have been made in the mechanical laboratory of the Massachusetts Institute of Technology on the transmission of power by belting to determine the ratio of tension when pulleys are slipping under the belts, and when belts are sliding over pulleys by means of the sun, and the difference of the tension of the slack and tight sides of the belting. A constant load is brought on the shafting by means of a nicely-made Prony brake, on which the power used can be weighted, and by means of a counter on the shaft that gives the number of revolutions per minute, by which the difference in the tension of the two sides of driving belt can be computed to a nicety. The next operation is to compute their amount while the shaft is still in motion, which is accomplished by transmitting the power from the driving shaft to another in the same line by an intermediate shaft, which is hung from these by two belts of equal length, the pulley being of equal diameters. Now, the supports which contain this hanging shaft are attached to levers, by means of which the sum of the tension on each of the belts by which it is suspended can be weighted. Speed counters are attached to each shaft, and with the break the sum of the tension on both the returning and the starting side of each belt and their difference is shown, from which one-half the sum added to one-half the difference will be the strain on the driving stretch, and the remaining half, less one-half the difference, will give the tension on the slack side, without the assumption of any friction theory being entertained. With this apparatus the least amount for the combined tension with which a shaft can be driven without the belt slipping off can be determined for transmitting a given power at a given speed of belt, and the speed with which the belt is slipping on the pulleys. If a given power is to be transmitted with a given speed, and the slip-pages of the belt not to exceed a given amount,

the strains from this belt and the tension on each side, and questions of a similar character, can be definitely answered. Then on the question of the width of a belt: If 663 pounds per inch of width through this lace-holes is a safe working strength, all that is required is to divide the tension on this tight side of the belt by this amount to get at the width in inches.

Science in the Workshop.

When mechanics as a general body become more thoroughly impressed with the conviction that the way to advancement, both as to personal position and monetary returns, lies through the mastery of science, in the application of principles to their daily work, we may anticipate some joint movement on their own part to establish means for acquiring technical knowledge. We might multiply examples of the benefit of courses of scientific training. The proper understanding of the laws of expansion and contraction, as applied to many castings, and even to the wrought iron and steel industries, would prevent much waste in the foundry and at the forge, from the effect of unequal expansion and contraction, and also occasion fewer inequalities in the quality of that supposed treacherous material, steel. It would also prevent many mishaps to boilers, engines and their accessories in cold weather. A knowledge among workmen of the principles of inertia as affecting bodies in motion, would frequently prevent a breakdown in starting or stopping machinery suddenly. For all connected with blast furnaces, the value of chemical knowledge is apparent, as enabling them to trace the cause of faulty results. There is scarcely a workshop of any importance in which an acquaintance with geometry will not be of value. In short, the value of science asserts itself every hour in the workshop. The scientific mechanic never falls into ruts, either of thought or habit. Working more intelligently than others, he finds more pleasure in his labor. His suggestive faculties are ever at work, and he is ever alive to the possibility of mechanical improvements, from which he may reap a handsome reward. The manufacturers who have risen from the bench without acquaintance with technical science constantly feel themselves at disadvantage.—*Trade Review.*

CARBON IN STEEL.—A correspondent of the *American Engineer* furnishes some food for thought in regard to the combination of carbon and steel under certain conditions. The correspondent among other things says: "We note quite an inquiry for fresh thought on the subject of bettering the condition of tire metal, physically and chemically. Suppose we start with pouring the metal into the molds, we find that when the 'heat' has been properly cooked the carbon in it is hotter than the iron; it remains hotter, by reason of its refractory nature while cooling, until it combines with a small per cent of the iron. When the initial temperature is allowed to subside before any work for reduction is done on the metal and fresh heat has to be used for annealing the skin, then most likely the iron, by reason of its being a fair conductor, gets hotter than the carbide, which, at best, is a first-class non-conductor. This makes two dissimilar elements to deal with under the hammer or in the rolls—95 to 97 per cent soft ductile iron, the other 3 to 5 per cent mostly hard carbide forming their cell walls, isolating the atoms of metal, so cohesion is out of the question. Under existing systems the work of fining up the metal is not done till after a portion of the carbon has combined chemically and irrevocably until melted again with a small per cent of the iron to form an irregularly cellular structure which will keep the shape of the metallic mass, without its weight or strength, after all that is valuable for actual service is eaten out with salt water or weak acid."

STEAM BOILER INSPECTION.—The benefits to be derived from the Hartford Steam Boiler Inspection and Insurance Company are becoming more and more apparent each year. The amount of business transacted by the company in 1886 was the largest that has been done by it during any one year in its history. The premium receipts exceed those of any other year. The assets of the company are upward of \$679,000 as against \$554,000 one year ago. The prospects for future business are very flattering. The company is called on for advice in the construction of boilers and laying out boiler plants, and is constantly doing a large business in that direction. It has laid out more than 50 plants during the past year, all of which are giving complete satisfaction. In laying out and arranging these steam boiler plants the company studies the economy of fuel, which is a matter of great importance to manufacturers in these days of close margins.

DEMAND FOR MACHINERY.—The demand for heavy machinery for every conceivable manufacturing purpose was never greater than at this time. Engines with horse-power ranging from 100 to 500 are now in common use, and manufacturers of machinery of huge proportions for textile work for general manufacturing purposes are overrun with orders.

COLLAPSE IN LOCOMOTIVE BUILDING IN EUROPE.—Reports are to the effect that there is a great falling off in the demand for locomotives at European shops, notwithstanding the fact that prices have fallen to nearly one-half what they were 10 years ago.

SCIENTIFIC PROGRESS.

The Magnetic Pole and the Aurora Borealis.

For the same latitude, the United States is better situated than other lands to view the aurora borealis when it breaks forth. At Pekin, in China, a display of the northern lights has never been seen, and the Chinese are very careful with their records of this character, and run much farther back into ancient time than our own. Still, Pekin is about the same distance from the North pole, or on about the same parallel of latitude as Philadelphia, Indianapolis or Denver, at which places the auroral displays are very frequent and oftentimes quite vivid. In the latitude of New York City, they are as frequent and brilliant as along the northern shores of Siberia, although the latter is nearly 2000 miles nearer the pole. In fact, the aurora borealis has a sort of pole of its own, or what we call the magnetic pole.

Now this magnetic pole is just north of the United States, and some 1400 miles nearer to us than the geographical pole or earth's axis; so this readily explains why we see more frequent displays of the northern lights than our opposite neighbors, who must be some 1400 to 1500 miles nearer the polar regions to see them as well as we do. But this magnetic pole is traveling slowly westward around the other pole, going around the earth in its parallel of latitude every 1000 or 2000 years; and the time will come in the far future that the Chinese at Pekin will have as frequent displays of the aurora borealis as we do now, and we will then have none.

Nearly all our readers have probably seen the beautiful bows of brilliant flame the auroras form in the north. Well, the center or highest point of this bow or arc is always directly over or on a line drawn from the spectator to the magnetic pole. Its highest point appears almost directly north to us, because the magnetic pole is almost due north; but in Great Britain or Norway the highest point of the beautiful chromatic curves would be to the northwest, while in Siberia or the upper part of the Japanese islands the top of the arc would be to the northeast. In fact, many explorers have been north of the magnetic pole, and from there they see the highest point of this brilliant bow in the south, and if they passed northward on the east side of this peculiar pole, the auroral arc was in the west at the time. The magnetic pole is laid down on the map on the west side of the Baffin peninsula. It was here that it was discovered and located by Sir James Clarke Ross in 1831, but since that time it has traveled westward. The rate at which it so travels is given various values by different scientists. There seems to be a general movement westward around the world of all magnetic forces, which the pole is only accompanying with all the rest.

When the mariner's compass was first discovered, or brought from China, many hundreds of years ago, the needles pointed nearly north in England and the magnetic pole was probably about Spitzbergen, or between that country and Greenland. Now the place where the needle points true north is in the United States, having crossed the Atlantic; and in Great Britain the magnetic needle points nearly north-west. And so the auroral displays, which are celestial manifestations of magnetic force, are also slowly traveling around the world every 1000 to 2000 years, giving each northern country a series of most beautiful effects.

But if the aurora borealis is so dependent upon the north magnetic pole, and increases in frequency and brilliancy of display as it is approached, what must they be, one would naturally think, at the magnetic pole itself? The first inference is that we would expect to see a perfect dome of playing prismatic colors in the heavens all the time, or at least in the winter, when the long arctic nights would be favorable toward such brilliant effects. On the contrary, the north magnetic pole is one of the poorest places possible to see the maximum displays of these fireworks of the frigid zones. The author of this article spent a small part of a winter very near this spot—near enough to have witnessed any aurora, and the few displays witnessed were so many were expected were quite noticeable for their paucity, after diligently watching for them for a long time. In fact, an observer must get a few hundred miles away from the magnetic pole to see the greatest number of aurora borealis and the finest displays of them.

LIGHTNING HOLES.—Prof. Brun has published in the *Archives de Geneve* an interesting study on the so-called lightning holes to be found in the High Alps. He and other investigators have found them at heights at between 11,000 and 13,000 feet above the sea level. Usually they are found on summits. Sometimes the rocky mass, which has been vitrified in the passage of the electric fluid, presents the appearance of small scattered pearls, sometimes of a series of semi-spherical cavities only a few millimeters in diameter. Sometimes there are vitrified rays going out from a central point to a distance of four inches or five inches. Sometimes a block detached from the mass appears as if bored through by a cannon ball, the hollow passage being quite vitrified. The thickness of this vitrified coating or stratum never exceeds 1 millimeter, and is sometimes not more than the quarter that depth. The

varying colors which it presents depend on the qualities and composition of the rock. The same may be said as to its transparency. On the Rungfischhorn this glass thus formed by the lightning is black, owing to the quantity of actinolite which this rock contains. It is brown on La Rivolette, the rock consisting of feldspar mixed with gneiss containing chloride of iron. Under the microscope these lightning holes display many interior cavities, which must be attributed to the presence of water in the rock at the moment of melting by the electric discharges. This vitrified material has no influence on polarized light.

EFFECT OF IMPURITIES IN GOLD ALLOYS.—The way in which an alloy of gold and copper is effected by a small quantity of impurity presents one of the most serious difficulties in working gold. It has been known since the seventh century that minute quantities of certain metals render gold brittle, and in a recent lecture at Birmingham, England, Prof. Austin Roberts said: "It may be well to demonstrate the fact. Here are 200 sovereigns. I will melt them and will add in the form of a tiny shot a minute portion of lead amounting to only the 2000th part of the mass, first, however, pouring a little of the gold into a small ingot, which we can bend and flatten, thus proving to you that it is perfectly soft, ductile and workable. The rest of the mass we will pour into a bar, and now that it is sufficiently cold to handle, you see that I am able to break it with my fingers, or at least with a light tap of a hammer. The color of the gold is quite altered, and has become orange-brown, and experiments have shown that the tenacity of the metal—that is, the resistance of this gold to being pulled asunder, has been reduced from 18 tons per square inch to only five tons. These essential changes in the property of the metal have been produced by the addition of a minute quantity of lead."

THE PITA PLANT—A VALUABLE FIBER.—The pita plant, a native of Honduras, invites the enterprises of American capital and inventive genius. Our consul there, Mr. Burchard, reports that the plant has never been cultivated or utilized to any considerable extent by any outside people; but it grows spontaneously and in apparently inexhaustible quantities by the margin of every river and lagoon, and indeed anywhere below the altitude of 2000 feet, and can be had for the cost of cutting. The fiber is susceptible of many important uses. The natives convert it into thread for sewing boots and shoes, and into nets, fish-lines and cordage. The finest and most costly hammocks are also made of it. The small quantities which have been exported into manufacturing communities have been worked up into handkerchiefs, laces, ribbons, false hair and wigs. The difficulty is to decorticate the plant without rotting or otherwise injuring the fiber. The man who can do that will be able to take fortune at the flood.

MORBIN IMPULSES.—Question: What is the cause of a person having a feeling as though he had to jump or throw himself down, while standing near the edge of the wall of a high building, or place 40 or 50 feet above the ground? Answer: This feeling is due, we think, to a sudden confusion of mind produced by the new situation in which one finds himself when brought to survey the prospect from a lofty elevation. It is a change in relation to one's surroundings that seems at first to set experience at fault, and the faculties of perception, therefore, are at first disturbed and out of coordination. Size, weight, locality, etc., in many persons may require time to adjust themselves to the new conditions. Men who are accustomed to work at great elevations—roofers, painters, etc.—do not as a rule suffer from such morbid sensations, because their faculties have become educated to the relations of altitude.—*Herald of Health.*

PRODUCTION OF SOUND.—Sound is produced by the vibrating body creating a movement in the surrounding atmosphere, just as a stone thrown into water makes ripples on its surface. The particles of the air propagate this impulse one to another, and the waves thus formed finally strike on the ear, making the impression on the auditory nerve which is flashed inward to the brain, where it is perceived as sound. It follows that there is no sound, although there are vibrations, unless there be a hearer. The thunder rolls in silence, the avalanche falls noiselessly, unless reverberated in the living ear, which can translate the rushing of the disturbed atmospheric atoms into sound.

ANTIQUITY OF THE HOT-AIR FURNACE.—The younger Pliny, writing to one of his friends about one of his country seats, mentions, among other things, that next to the smaller drawing-room there is a semi-circular room with windows arranged so as to get the light of the sun all day. He says: "Out of this is a bedroom which can be warmed with hot air." He also refers to the "bath with its cooling-room and its hot-room." As Pliny, Jr., lived A. D. 62-116, we may assume that hot-air furnaces are no new thing.

QUICK MECHANICAL WORK.—By the addition of automatic attachments to a press and pair of gang dies, the Ferracute Machine Company, of Bridgeton, N. J., has succeeded in procuring 288,000 lamp collars per day in a single press. This is at the rate of 480 per minute, and affords an explanation of the low prices of some sheet-metal manufactures.

Placer Mining on the Salmon.

The Salmon river, like many other mountain streams of Northern California, is mined continuously from its narrow, precipitous beginning to its mouth. The rapid fall of its waters afford unusual advantages for working the extensive gravel deposits which are found on its many bars and points running down to the river channel. Large ditches taken out a few hundred yards above and graded along the canyon give sufficient pressure for a "pipe-head," by which numerous of these bars and points are being worked day in and day out for the shining particles of wealth which they so abundantly contain.

Before the day of "giants" and "hydraulics" the hardy pioneer miner toiled laboriously with pick and shovel in what was termed ground sluicing. Those days and men are gone, but their old work—the solemn indications of other times—remain, and where even these are supposed to be exhausted the almond-eyed Mongolian now reveals in all his glory, diligently and indefatigably searching for what was in those days passed by as of little consequence.

Among the principal placer claims the Summerville hydraulic mine is deserving of special mention. The mine is under the direct supervision of Geo. C. Spooner, who is a very able and experienced miner, having been engaged in the business for years in various mining districts of this State. The water utilized at this mine is principally obtained from the headwaters of the Salmon river, which has its elevated source in the lofty Salmon mountains. In order to convey to the mine the vast quantity of water used, the company has a ditch six miles in length and two others much shorter. The first section of the long ditch descends Right-hand gulch, a distance of two miles. Here, by means of a conduit of sufficient size, the entire ditch head is carried down within 90 feet of the river, a distance of 150 feet, and up on the opposite side to a corresponding level, where it forms a junction with the ditch from Left-hand gulch, and continues down the canyon till reaching Summerville. The company has three large giants, which, with the terrific pressure of 300 feet, sweep the boulders and gravel with frightful force precipitately before them into the flumes. These flumes, exacting their precious toll, deposit the heterogeneous mass of debris into the swift flowing river to be swept away by its foaming torrent. The abundant water, high pressure and good dump enable the company to work off a vast area of their limitless supply of mining ground annually. And it is not to be doubted that, for its advantageous situation and natural facilities, the Summerville mine is the best placer claim in Siskiyou county.—*Cor. Yreka Union.*

Academy of Sciences.

At the regular meeting of the Academy of Sciences, on Monday evening last, President Harkness was in the chair. Walter E. Bryant was elected a resident member.

Dr. H. H. Behr read a paper on "The Power of Adaptation in Insects."

The president spoke of the fungoid growth affecting the eucamores, which he had been observing for many years. Every season when the eucamore leaves attain the size of a quarter of a dollar, they become blighted, sometimes being fresh and green in the evening, and the next morning being blighted. He observed the same thing in the East, and had been told by Prof. Gray that the eucamores of Massachusetts had been affected in this manner for 50 years. Dr. Harkness had made careful observations, and determined the cause to be a minute fungus, which he had named *Glaesporium Platoni*. In former years the eucamores had been well-shaped, but now they are generally scrawny and unsightly, with few straight limbs. This he attributed to the ravages of the fungus.

Dr. C. M. Richter read a supplemental paper to that read by him at the previous meeting, refuting certain criticisms made by Professor Geo. Davidson upon the statements in that paper, as published in the newspaper reports of the Geographical Society meetings.

One of the audience, a non-member, asked the president permission to speak, and stated that he had resided for some six years in the vicinity of Bahrings' straits, engaged in observation for the Smithsonian Institution, and that he would corroborate Prof. Davidson's views on the subject of the currents. A discussion ensued in which this gentleman, Dr. Richter and Dr. Behr took part.

Dr. W. P. Gibbons interrogated the secretary at some length concerning the publications of the Academy, more particularly as to the publication of the president's inaugural address, read January 17th, and the changes made in the cover of Bulletin No. 6. He afterward addressed the Academy on the subject.

The new hoisting works of the Wildman, at Sutter Creek, are getting along first rate, and the people there are rejoiced at the prospect of soon seeing a big mine in running order, hoping that it will be but the forerunner of the opening of other mines in the immediate vicinity.

The southern portion of Esmeralda county, Nevada, which contains several mining camps and many valuable mining properties, is presenting a prosperous outlook.

GOOD HEALTH.

Can Cancer be Cured?

"Is there a positive and reliable treatment for cancer? Is there a reliable remedy that will effectually cleanse the blood of a cancer humor?"

EDITORS PRESS:—The above queries appear in the columns of *The Brief*, a well-known medical journal of New York. They are put forth in a communication to that journal by P. C. Smith, M. D., of Orrington, Maine. No attempt is made to answer the queries.

Medical books contain no reliable remedy, nor do they prescribe any uniform mode of treatment for cancer, in any of its various forms. Yet we sometimes meet with reports of supposed cures in medical journals. The last number of *Braithwaite's Retrospect of Practical Medicine* contains an article from a London physician, in which the editor is asked, "Shall we ever be able to cure or arrest this disease [cancer]? I am afraid not; but in some cases we may." Quits a number of cases are cited in which the progress of the disease has been materially checked, and one instance is referred to where the cancer quite disappeared of itself, without any application, internal or otherwise. Another disappeared from treatment other than by the knife. But in no case is it claimed that a direct cure had been effected under any treatment designed to "cleanse the blood of a cancer tumor." The writer in *Braithwaite* disapproves of the use of the knife in all cases of cancer in the breast. Plasters to "cut out the cancerous tumors" are suggested as preferable. Another article in the same number makes quite a lengthy reference to

The Use of Olan Turpentine

In cancer on the tongue, lip and uterus. This article is written by John Clay, M. D., the man who first suggested to the medical world, some six years ago, the use of that remedy. As an evidence of the unwillingness of a great majority of the medical fraternity to admit of the possibility of anything like a "cure" for cancer, Dr. Clay asserts that this remedy has never been received by the medical profession with very considerable favor, and adds: "Much outspoken, not to say hostile, criticism of the remedy has characterized the discussion which resulted from that communication." And yet there are numerous isolated cases of at least apparent cures which have resulted from the use of the remedy with no detriment to patients under any circumstance. Four apparent cures are reported in the article before us which have recently been noted. It is to be regretted that so much prejudice should be found among medical men in regard to any treatment other than the knife for this malady.

The Writer of This Article

Having twice been called to lay away a life companion—in both cases victims to the dreadful malady which forms the subject of this present writing—has very naturally been induced to inquire somewhat carefully into the whole matter of the causes and treatment of cancers. His unfortunate experience (probably without a parallel in medical history) may be accepted as some excuse for the unusual interest he is taking in the subject, and his lack of medical knowledge will account for the difficulties encountered in the study thereof. Medical books, medical serials and extended conversations with prominent medical practitioners have been the media through which information has been sought. In this search he has learned that there is a great diversity of opinion among medical men as to the origin, spread in the system and treatment of cancers and cancerous tumors. In the course of his investigation, and in an honest search for truth, he has been guilty of the unpardonable act (in medical minds) of sometimes going quite out of the beaten path laid down and fenced in by medical schools for such research. He has gathered up and carefully studied many publications of non-professional men, who have assumed to "cure cancers" by secret methods of their own. He has visited patients who have come from all parts of the continent, and learned of not a few sad victims of their practice. But, quite remarkable as it may seem, it has been exactly in this direction that the greatest light has been found—the most promising ray of real hope for an effective remedy for this terrible scourge of humanity.

Personal Investigation.

Having discovered some small evidence of the truth for which we were seeking, we carefully avoided all contact or intercourse with the practitioner, but sought out and interviewed a large number who had received benefits. We readily found a full half-score of persons who had been under treatment or examination of the best physicians and surgeons of this city—most of whom had been operated upon once or twice, but in whose cases the malady as usual had returned, and the patients were told that they must submit to the second and third operation. In all the cases that were interviewed, chance or personal friends had taken them to the practitioner in question, whose identity, at least for the present, shall be nameless, as this is no advertisement. The result in every case examined has been favorable. Positive cures appear to have been effected, as in some cases six and eight years had elapsed without any return of the malady. We do not wish to be understood that no failures were encountered. This specialist, like all

others engaged in the healing art—as we subsequently learned—lost patients, but only in cases where the knife had been used or the disease had advanced to a very critical period. After months of the most diligent inquiry, we have been unable to hear of a single failure where a patient has been presented at an early stage of the disease, or up to the time when in ordinary practice the knife would be applied. These observations and the testimony of so many living witnesses, and a reference to a great number of others, whose examination would have been simply cumulative and involved only a useless loss of time, so impressed us that we resolved to interest, if possible, some of our regular practitioners in the matter, and secure a class of observations from an admitted medical standpoint.

Seeking for Medical Investigation.

Seeking for aid in this direction we soon found was uphill work. The fact that the practitioner kept the remedy a secret was at first a bar to any progress, although the party is a licensed practitioner under the eclectic school of medicine. But having become convinced in our own mind that the matter was well worthy of a thorough medical investigation, the writer continued his interviews with different physicians, begging of them in the name of humanity and for the real furtherance of medical science to lay aside all prejudice, and for this once stop over the iron bound rules of medical ethics to look into the matter sufficiently either to remove our own, perchance erroneous impressions, or possibly, if it might be, substantiate them as correct. Should the latter be the case, we hoped that a sufficient influence might be brought to bear to procure an official investigation by the faculty, on the successful result of which a sum might be raised to purchase the secret for the benefit of the world.

An Intelligent Medical Inquiry.

After many failures the writer finally succeeded in interesting several intelligent physicians in the inquiry—every one of whom, after a full and free investigation, meeting with large numbers of patients who have submitted themselves to treatment, and visiting patients under treatment from time to time, and noticing decided and most remarkable improvement, has expressed the opinion that the matter is well worthy of a more thorough and official investigation by some properly organized and fully acknowledged medical body. We understand that the matter has been laid before the City and County Medical Association of San Francisco, which body decided that, under their rules and regulations, they could not consider it.

We regret that the investigation could not have been made without any outside or newspaper talk, and kept quietly within the body of the fraternity itself until some result was reached, either for or against. The fact that eight different physicians have taken it upon themselves to make personal investigations and have all come to the same conclusion, that the matter is worthy of a still more extended and careful inquiry, shows that it has merit. And we now and here express the opinion that there is not a physician in San Francisco who will take the trouble to spend half the little time that those to whom allusion is made have done, who will not come to the same conclusion, if he allows his reason to act, free of prejudice.

As there are several parties who have taken notes of their observations upon cases under treatment, we have made application to one who is perfectly willing to place his notes in our hands for publication. The whole matter will now be brought directly to the ear of the public, so that they can judge for themselves of the value of the evidence which the medical profession, as a body, has ignored.

W. B. E.

USEFUL INFORMATION.

Plumbers' Recipes.

The *Sanitary Plumber*, which should be good authority in such matters, gives the following recipes for plumbers and others:

Chloride of zinc, so much used in soldering iron, has, beside its corrosive qualities, the drawback of being unwholesome when used for soldering the iron tins employed to can fruit, vegetables and other foods. A soldering mixture has been found which is free from these defects. It is made by mixing 1 pound of lactic acid with 1 pound of glycerine and 8 pounds of water.

A wooden tank may be rendered capable of withstanding the effects of nitric or sulphuric acids by the following method: Cover the inside with paraffine; go over the inside with a sadiron heated to the temperature used in ironing clothes. Melt the paraffine under the iron so as to drive it into the wood as much as possible, then, with a cooler iron, melt on a coat thick enough to completely cover the wood.

For brassing small articles: To one quart water add half an ounce each of sulphate of copper and protochloride of tin. Stir the articles in the solution until the desired color is obtained. Use the sulphate of copper alone for a copper color.

To clean rust from polished steel, mix 10 parts of tin putty, 8 of prepared buck's horn, and 25 of spirits of wine to a paste. Cleanse

the article by rubbing with this, and finally rub off with blotting paper.

A good cement for celluloid is made from 1 part shellac dissolved in 1 part of spirit of camphor and 3 to 4 parts of 90 per cent alcohol. The cement should be applied warm, and the broken parts securely held together until the solvent has entirely evaporated.

Tin and tin alloys, after careful cleansing from oxide and grease, are handsomely and permanently bronzed if brushed over with a solution of 1 part of sulphate of copper (blue-stone) and 1 part of sulphate of iron (copperas) in 20 parts of water. When this has dried, the surface should be brushed with a solution of 1 part of acetate of copper (verdigris) in acetic acid. After several applications and dryings of the last named, the surface is polished with a soft brush and bloodstone powder. The raised portions are then rubbed off with soft lather moistened with wax in turpentine, followed by a rubbing with dry leather.

IMPROVED TELEPHONE WIRES.—The German post-office is now using, to a considerable extent, the new anti-induction telephone cables made by Messrs. Felten & Guilleaume and others. The usual cable for overhead circuits contains wires of 27 to 30 mm. diameter, each separately insulated, and wrapped on the outside with tin foil. The cable thus formed is surrounded with three naked copper wires, and sheathed with a lead covering. The whole is protected by a hemp taping and bitumen. These cables, when used for overhead circuits, are not strong enough to support themselves, and must be suspended from cast steel wires. The three naked copper wires, as well as the wrappings of tin foil, are all connected to earth. A smaller cable, containing only 14 wires, is also manufactured. A large number of these cables are now erected throughout Berlin, and are used with satisfactory results.

HOW TO DO LUSTER PAINTING.—This is simply painting with bronze powders, metallic flitters, etc., instead of paints. The pattern must be first stamped as for embroidery. The outlines may then be heavily outlined with a fine brush. The paints are laid on with flat bristles brooches, Nos. 5 and 11 are the sizes most used. Arrange the powders and bronzes in the hollows of the palette, and mix by adding a little of the medium. As the medium dries rapidly, only a few colors should be mixed at a time. In working the most delicate parts, take only a little paint at a time on the brush. In painting velvet or plush, always paint with the nap; that is, draw the brush down in the same direction the nap runs. Do not be afraid of using too much paint. Apply it thickly but lightly to the surface. If flitters are used, they should be sprinkled on the fresh paint before it dries.

SOLDERING COPPER.—When copper is soldered and the solder is to be colored like the surrounding copper, this can be done by moistening the solder with a saturated solution of vitriol of copper, and then touching the solder with an iron or steel wire. A thin skin of copper is precipitated, which can be thickened by repeating the process several times. If a brass color is desired, a saturated solution of one part of vitriol of zinc and two parts of vitriol of copper is used on the previously coppered solder, and the latter rubbed with a zinc wire. To gild the soldered spot, it is first coated with copper in the manner indicated above, then with gum and isinglass and powdered with bronze powder. A surface is obtained, which after drying can be very brightly polished.

BRICKWORK may be rendered waterproof by the application of the following wash: Soft paraffine wax, two pounds; shellac varnish, one-half pound; powdered rosin, one-half pound; benzoline spirit, two quarts, all dissolved by gentle heat in a water bath, to which is to be added one gallon of benzoline spirit. The wash is to be applied to the brick wall warm, care being taken to keep it away from the fire, as the mixture is very inflammable.

TO DETECT SEWER GAS.—A very simple test to ascertain whether the air of any apartment contains sewer gas is made by saturating unglazed paper with a solution of one ounce of pure lead acetate in half a pint of rain-water; let it partially dry, then expose in the suspected air. The presence of sewer gas in any considerable quantity soon darkens or blackens the test paper.

THE LONGEST TUNNELS IN THE WORLD.—The Mount St. Gothard tunnel is 48,840 feet long, or nearly 10 miles long, the longest in the world. Mont Cenis tunnel, Italy, is 36,840 feet long, or about seven miles long. Hoosac tunnel, Massachusetts, is 25,080 feet long, or about 4½ miles. The Nochtongong tunnel, 21,650 feet long, or about four miles. Thames and Medway, England, is 11,880 feet long.

TO CLEAN FEATHERS.—Make a lather of curd soap, boiling water and pearlash; when it is a little cool, wash the feather in it, gently squeezing it; wash it again with less lather, and then rinse it in cold water, shaking it well before the fire, but not too near. Curl it by drawing each fiber over the blunt edge of a fruit knife. If the color is not good, use a little blue in the rinsing water.

ADULTERATED FLOUR, ETC.—Flour and other farinaceous substances are spiced with plaster, potato starch and other similar cheap ingredients.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador Dispatch, Feb. 26: Work on the Wildman mine is progressing as rapidly as possible. Frank Mails has the contract for laying the pipe some 2000 feet, which he will complete in a short time, weather permitting.

WORK RESUMED.—Amador Ledger, Feb. 26: Work has been resumed on the Sargent mine at Middle Bar, under directions, we are informed, of W. Petre, one of the bondholders. The Amador or McKay mine is moving along very slowly. The shaft is down 130 feet. Rumor has it that the Maboney mine has been sold, and that the parties interested have gone home to make out the papers. It is the universal hope that this report may prove true, as it will give some foundation for hope that the mine will ever long be started in a business-like way. The Zeile mill had to take to steam for 48 hours last week, owing to a break in the canal near Bald Rock flume. The Cupps or Chicago mine, just east of the New London, is being energetically worked. The shaft has reached a depth of 60 feet. The work is under the supervision of Mr. Cupps, who has agreed to give nearly one-half interest in the property to the capitalists of San Francisco who are furnishing the necessary money for its development. The Amador gold mine is in Hunt's gulch, John I. Minear, superintendent. It was formerly the McKay mine. It is being worked on a small scale, with encouraging prospects. The Middle Bar gold mine is located at Middle Bar, near the old Hardenberg mine. Little has been done in the way of its development, but it is considered a likely spot to develop into solid property.

Calaveras.

BULLION.—Cor. County Record, Feb. 26: The Esmeralda mine on Indian creek is doing finely; the shipment of bullion is regular and generous. I was told upon good authority that the owners have refused an offer of \$50,000 for the mine from Haggins. R. H. McDonald, president of the Pacific Bank, is one of the owners. Work on the Oro Plata mine has been much retarded the past few weeks on account of the inclemency of the weather, and it will be some weeks ere the full complement of men are at work again. The burlighs and pulverizers are in full blast, however. The company paid off on the 23d.

WEST POINT.—Calaveras Prospect, Feb. 26: A gentleman who recently visited the Lookwood mine, at West Point, gives a very flattering report of that property. Shaft, 200 feet deep; vein, five feet and widening; ore pays \$130 per ton on an average. Rock has to be carried three-quarters of a mile in wagons to an eight-stamp mill. This is a young enterprise with very bright prospects.

UNION MINE.—Cor. Calaveras Prospect, Feb. 26: A flying trip to Union mine discloses the fact that we have here a second Sheep Ranch mine. One not conversant with this big enterprise that has been inaugurated in the vicinity of San Andreas, and the demand it creates for material to carry on its extensive operations, would, at the sight of so much fuel piled up around the engine-house, wonder if the company had designs upon the surrounding timber land; also, judging by the thousands of feet of large timbers piled up here and there (used in the mine), that they owned a sawmill or two. All this is a big demand for the county's resources. This mining enterprise has created an extensive field for the wage-worker.

El Dorado.

HENRYS DIGGINGS.—Mountain Democrat, Feb. 26: All the mines closed or stopped work on account of the heavy fall of snow, this snowstorm being by far the largest in five years, four and a half feet at this place. The men at the Crystal mine have been compelled to stop work, the flume having been broken by a number of trees falling across it; consequently they cannot run the blower, and will be obliged to wait for the snow to melt off before repairing damages.

Fresno.

HILDRETH NEWS.—Fine Gold Miner, Feb. 25: In the James & Francis mine, the ledge of 16 inches of sulphurets, opened up last week, has increased to two feet in size upon this week's development in the working shaft. The sulphurets ore will assay \$700 per ton. The ledge-matter of three feet averages \$85, in coarse gold, by arastra. Superintendent Wahls, of the Hildreth mine, is sinking on the working shaft, and has been boistering some very fine ore—too rich to lay on the dump. The ore is sacked for storage. At present the shaft is 330 feet deep. The rich body of ore in the White Rock ledge holds its own in the south drift. The ore contains one-half galena sulphurets, and will mill \$65 per ton in coarse gold. The late discovery of the Big Bonanza mine, by J. H. Clark and T. W. Robinson, at the face of the tunnel, which is in 70 feet on the ledge, is two feet between walls that prospect \$50 per ton in coarse and fine gold. The owners have started a winze in the tunnel. The McNally mine is hoisting from 55 to 60 cars of ore daily, which is consumed by their mill, including sulphurets. The ore averages, milling value, \$75 per ton. The Morrow mine, at present, is being opened up by tunnel and drifts upon a good body of quartz that averages in size from one to two feet, which is accompanied with a clay, talc, and porphyry gouge that prospects well. The quartz vein will mill \$35 per ton. The Pelan ledge is being sunk upon with an incline on an 18-inch ledge. The owners are taking out ore which will be run through the Hanover mill. Since the heavy rains last week, Mr. Williams has been sluicing the surface upon his placer location. Pete Donahoe has bonded the Morning Star mine. Superintendent John McNally arrived upon Wednesday's stage, after a four-weeks' visit to San Francisco, looking as hearty as ever. The Hildreth mine commenced hoisting rock from the bottom, Monday. The ledge looks a good deal better than many thought it would. The James & Francis mine surprised its owners Wednesday morning, when 18 inches of sulphurets, of a high grade, were developed. Wonders have ceased in this mining district. This mine is to-day the richest mine in the district. From the breaking of the surface ground for the working shaft down to its present depth of 135 feet, the top, bottom, and

sides will prospect surprisingly. The owners asked \$50,000 for the property, and, from San Francisco authority, could have got, not long since, \$100,000 by holding out.

Inyo.

GOLDEN STAR MINE.—Independent, Feb. 26: Further sinking in the shaft of the Golden Star mine has been postponed for the present. At a depth of about 230 feet quite a strong flow of water was encountered, and Mr. Paterson then stopped sinking and is now drifting in ledge matter. No regret is caused by finding the water; on the contrary, it is quite welcome, and is regarded as a very favorable indication of a good ore body.

Nevada.

GOOD ROCK.—Foothill Tidings, Feb. 25: Glasgow, Richards & Co. are the lessees of the Florida mine, just back of Iord's ranch, Rough and Ready township. A tunnel is in 130 feet on the main ledge, which is one foot thick. There is another ledge two and a half feet in thickness running parallel to the ledge first mentioned, with a gouge of three inches intervening. On Wednesday, from this ledge, several pieces of rock showing well in gold and base metals were taken, and can be seen at Coleman & Glasston's store. The two ledges are of widely different characteristics, the smaller one being free-milling ore, while rock from the larger ledge will have to be worked by the chlorination process to give full returns. The two will probably unite further on in the tunnel.

ANOTHER BREAK IN THE DITCH.—Grass Valley Union, March 2: Supt. Coleman, of the Idaho mine, yesterday received a dispatch from J. E. Brown, Supt. of the South Yuba Canal, that another break had occurred in the Cascade ditch, and that the water was one day behind. The water may come through today, but of that there is no certainty. The force of men from the Idaho mine did two days' work on the line of the ditch, clearing out the snow from the Idaho reservoir to a point some distance beyond the main South Yuba reservoir at Banner mountain. The Canal Company's force is working above that point, and were reported as making excellent progress in clearing the snow out of the ditch until the dispatch above referred to was received announcing another break. There cannot be much longer delay in getting the water through, as the weather is favorable, and no signs of the coming of another snowstorm.

San Diego.

ELSINORE COAL.—Los Angeles Times, Feb. 23: John D. Hoff, the fortunate discoverer of the extensive coal deposits at Elsinore, San Diego county, was in the city recently on his way home from San Francisco, where he has been to buy a plant for mining. While north he had his coal thoroughly tested by experts. It showed up better on analysis than the Seattle coal, which is being shipped to San Francisco by the cargo. The Elsinore coal gives 10 per cent of ash and the Seattle coal 18 per cent. The Elsinore article contains 41 per cent of inflammable gases, as against 33 per cent for the Seattle. The Elsinore coal is a true lignite of the same formation as the favorite Gallup coal, and Mr. Hoff, who has investigated the Gallup mines carefully, is satisfied that he has a better article. He is in partnership with John Dolbeer, a well-known San Francisco capitalist, and they control 400 acres of coal land, the present vein being four feet thick. The plant, which Mr. Hoff has just purchased, will enable them to mine 200 tons daily, and they promise to have their coal on the market within 60 days. The mine is four miles from the California Southern Railroad, and three miles from the lovely and growing town of Elsinore. H. B. Wilkins, General Freight and Passenger Agent of the California Southern Railroad, will visit the mine in a few days, to see about the practicability of running a spur to it.

Sierra.

PHOENIX MINE.—Tribune, Feb. 11: The Phoenix mine has shut down. From present accounts the company has concluded to wholly abandon the property. However, there may be a change in their intentions ere long. As the stockholders of the company are all wealthy, creditors of the mine need have no fear but that moneys due them will be promptly forthcoming. Supt. Schusler left for San Francisco Monday in obedience to a telegram from the company. It is said that the abandonment of the mine is due to the ore tests being unsatisfactory, netting only \$3.75 a ton.

Siakiyou.

THE BLACK BEAR MINE.—Yreka Union, Feb. 24: "The Black Bear mine is fast coming to the front," writes a gentleman well versed in mining affairs to the Union. "At present Lieutenant-Gov. Daggett has about 500 tons of ore at the mill, awaiting warmer weather, when the mill will be started. There is something like 200 tons broke at the mine ready to move. The ledge has been carried down perpendicular 92 feet, and in thickness varies from 2 to 8 feet. The ore is all good and the ledge is holding out good."

Shasta.

COUNTY NOTES.—Shasta Democrat, Feb. 19: The heavy fall of snow has driven many prospectors from the mountains. De Forrest is building several of his patented arastras, for which he has orders. The end of the lower tunnel in the Ballakalla mine is in a large body of rich ore. Tom Greene came down from the Gulch Mountain, and shipped another \$2500 gold brick. The Buckeye placer miners had a poor run so far this season. Weather too cold and water scarce. Next Monday the company having bonded the Scheerer mine, on Salt creek, will commence work on that mine. The Black Bear Mining Company is preparing to have its valuable group of mines on Squaw creek patented. Harry Berg and his partner Hall are running their arastra on Oregon gulch on ore that is paying between \$50 and \$60 a ton. The last of the machinery for the ro-stamp mill at the Muchmore mine at Lower Springs arrived last week and was shipped to the mine. The mill will start up immediately. Development work will commence on the Locofoco and Central mines, in the Squaw creek district, in a few days. The first opening will be a tunnel of 100 feet in length run in the vein, which is expected to expose a large body of ore. Last week Edward Riley & Co. took possession of the Central mine in Old Diggings district, having purchased the property. The former owners reserved about 150 tons of rich ore on the dumps, which they are now crushing. We understand that it is the intention of the new proprietors to erect a large stamp mill on the mine

in the near future. The Lower Springs Mining and Milling Company feel jubilant over their prospects. They claim to have several good mines in a group, which prospect well. Their furnace is completed and a trial has satisfied them that it will work like a charm. They are now preparing to put up crushing machinery. As soon as this is done, and there is a good supply of wood on hand, the works will be started up. We are informed that it is not the intention of the company to do custom work, for they will have all the ore of their own they will be able to handle with their plant.

Tuolumne.

SOULSBYVILLE.—Cor. Union Democrat, Feb. 26: Work has been commenced on the Basin mine, and it is not likely that it will be resumed until the storms are over; there was about 5 feet of snow at the mine Monday. The Trout mine, on the Tuolumne river and near the Basin, has also been closed down, and nothing more will be done till the weather is settled. It is a considerable drawback to the Basin and other mines, but will make an abundance of water next summer. It is reported that they have struck it rich in the bottom level of the Buchanan mine. Men were put to work cleaning snow out of the Rising Sun mine ditch, for the purpose of getting water to start the pumps, but the snow that fell on Monday is a setback to them again. The water in the Soulsby branch ditch has been off for several days, owing to there being so much snow in the hills. The Black Oak mine is running in full blast, there being about 14 men employed. The new booming works are completed. It is expected that this will be among the best mines in a short time. The indications now are very much in favor of the company.

NEVADA.

Washoe District.

IOWA.—Virginia Enterprise, Feb. 26: The storms during the week interfered somewhat with work. Tunnel A has cut east clay of lode, and passed over nine feet of very fine quartz, giving low assays. This body of quartz raised only about one foot above the floor of the tunnel, and is evidently the top of a chimney, which tunnel B will soon cut at a much greater depth. The face of tunnel A is now in vein material carrying considerable quartz. As the croppings show the ledge to be over 50 feet wide, something profitable may be expected before reaching west wall.

POTOSI.—Mining operations have been suspended on the 250 level on account of the snow drifting into the track leading from the tunnel to the dumps. Most of the miners were consequently laid off. Those at present employed in the mine are engaged in making necessary repairs.

ALPHA AND EXCHEQUER.—Good progress has been made the past week driving the north drift on the 122 level. Some of the quartz encountered carries metal that gives good assays. Fair progress has been made in extending the south and west drifts.

ALTA.—Work is going on as usual on 723 and 823 levels. The usual progress is being made in the north lateral drift into the Benton and Keystone ground. Everything in and about the mine is running smoothly.

HAYWOOD.—Expect to have the road leading from the mine to the mill in Gold canyon cleared of snow in a few days, when the usual shipments of ore will again be made. Everything in the mine looking well.

GLADSTONE.—But little work has been done in the mine the past week on account of the late storm. The main tunnel will be started up again as soon as the snow becomes settled.

UTAH.—472 level.—The north drift has been extended 20 feet; total length, 154 feet. This drift is still in porphyry, clay and quartz.

HALE AND NORCROSS AND SAVAGE.—Owing to the absence of Supt. Keating yesterday, we are unable to give the usual report of the mines.

YELLOW JACKET.—Everything going on as usual; extracting about 100 tons of ore daily, principally from the 1300 and 1400 levels.

CHOLLAR.—The work of repairing the shaft still continues. The shaft is now in excellent condition down to the 800 level.

IMPERIAL.—Operations during the week were confined to the work of repairing the main shaft.

OVERMAN.—Extracting and shipping about 60 tons of ore daily to the Vivian mill.

THE SNOW.—The snow is said to be from 40 to 60 feet deep in several places on the north side of Mount Davidson, where it was blown into ravines or settled upon small flats. The store of snow now piled up in the Sierra Nevada mountains is greater than for some years past. This insures an ample supply of water for milling and all other purposes next summer, unless there shall come a season of warm rains in March or April; a visitation which is unusual and not much to be feared. It is not only in the Sierras that the snowy treasure is heaped up; there are goodly stores of it in all the mountain ranges in the State. This will in many places facilitate mining operations.

Bartlett Creek District.

GOLD-BEARING LEDGES.—Cor. Silver State, Feb. 23: I have some good news from the Bartlett Creek country. There has been considerable prospecting carried on there this past summer and this present winter, which has resulted in the finding and opening up of some fine gold-bearing ledges north of the canyon in which the creek is situated. The ground is not broken as it is at the creek and the facilities for deep working cannot be excelled in the country. It is astonishing that that section has remained unnoticed so long, as there is a belt of gold-bearing ore some eight miles in length that can be easily traced, and all of which prospects well. Besides, there are ores of silver chlorides and argentiferous galena, which elsewhere would attract instant attention, but the indifference of Humboldt business men and the distance from the source of supplies prevent the district from receiving the notice which it merits. There is every facility for the reduction of ores cheaply, as there is an abundance of water-power in every canyon of the range, plenty of timber within 10 miles, and a climate that admits of work the year around. The prospects that have been found last are lying in slate and free from waste. They lie at an angle of about 60 degrees, and though the gold

is very fine, still it is very easy to find pieces of quartz in which it is visible to the naked eye. The ore is chiefly brown in color and is very heavy, owing to the abundance of sulphurets of iron and copper in it.

Cortez District.

MINES BONDED.—Reno Gazette, Feb. 22: S. Wenban, owner of the famous mines at Cortez, Elureka county, returned home on yesterday morning's Central Pacific express train, after a visit of a week in this city and Carson. While at the latter town Mr. Wenban took advantage of the opportunity to call upon the assay office officials and ascertain what disposition he could make of his bullion to the governmental establishment. Supt. Garrard informed him that he is not authorized to purchase bullion, and could only assay, refine, and stamp any that is shipped him. The charges for this service are the same as at the Selby Smelting Works in San Francisco, and consequently Mr. Wenban could see no object in his favoring the Carson establishment, as to do so would necessitate extra freight expenses. Mr. Wenban has quite a pile of bullion that has accumulated at his mill during the past month or two. At the present time he is working only 18 tons of ore daily. It is high grade, yielding about \$200 to the ton. The mines are undoubtedly the richest discovered in this State in many years, and are bonded to a gentleman representing English capitalists for \$1,300,000. Mr. Wenban is indifferent as to whether the sale is consummated or not; in fact, he prefers to retain the properties, as there is more ore in sight in them to-day than ever. He and his family located at Cortez 23 years ago, when for a long time their nearest white neighbor was distant some 60 miles, and now that his mines, that extend along a range for a distance of over a mile, are meeting his most sanguine expectations, he is loth to part with them.

Columbus District.

SHAFT BROKE.—Walker Lake Bulletin, Feb. 26: Last Friday the main shaft of the Candelaria mill broke. Immediate measures were taken to have a new one made, and by vigorous work and extra time the railroad machine-shop finished the work in time to send it out and have it in place and the mill in working order yesterday. The Candelaria Water Works and Milling Company is now so well stocked with ore that extra expense for rapid repair is preferable to delay, and excepting from causes such as the above, there will be no cessation of work for a long time to come.

Esmeralda District.

HINDLEY.—Esmeralda News, Feb. 26: Messrs. Byrum & Rulofson, large owners in the Hindley mine, were inspecting the mine this week. Owing to the snowstorm, the roads are impassable, thereby delaying the shipment of ore, but it will be resumed as soon as the roads are opened. Thorne & Shannon continue prospecting the Evening Star, and as depth is attained, the ledge improves in size and quality of ore. They have a nice lot of good ore out, and expect to ship a carload to the Reno Reduction Works by the first of next month.

Gillis Mountain District.

BETTER PROSPECTS.—Esmeralda News, Feb. 26: The Gillis Mountain mining district is showing better prospects every day. B. G. Smith, Candelaria's merchant, has two men working on his Tip Top mine, which is a silver proposition. He has a large amount of silver ore on the dump and prospects in the mine are very flattering. Mr. Smith has stuck to this mine, and has expended thereon considerable money, and from present indications, it is confidently expected he will be amply rewarded. The Star mine is being worked by the Gillis Company, which has five or six men employed. The veins, though small, are very rich, producing money right along. The Virginia No. 1 looks well, the prospects are excellent, and but for the recent snowstorm a shipment of ore would have been made. Now that the weather has moderated, in a short time bullion will be produced from several of the mines in this district.

Grantsville District.

TO BE WORKED.—Belmont Courier, Feb. 26: It is to be hoped that the owners of the Alexander, Brooklyn, and other valuable mines of Grantsville will resume operations on them this summer. Both the Alexander and the Brooklyn have produced large quantities of bullion, and ought never to have been shut down. Work would be progressing to-day had these mines been properly managed. Of course it will take money to open and work them properly. The owners are fixed to work them in good shape as soon as they shall feel so inclined, which cannot be too soon to suit the people of Western Nye and Grantsville in particular. The ore bodies are low grade—\$20 per ton in silver—and of vast size and unknown extent. Heavy machinery and plenty of stamps will make it a remunerative investment to the owners when they have nerve enough to open these mines and work them as they should have been worked years ago. The ore is there, and will more than pay for extraction and reduction if the work connected therewith is properly conducted. The Alexander property today is one of the best mining ventures in the State, and we cannot understand why the owners allow it to remain idle.

Lodi District.

TO RESUME WORK.—Belmont Courier, Feb. 26: It is thought that work will be resumed on some of the Lodi mines this summer.

Mount Cory District.

MOUNT CORY.—Esmeralda News, Feb. 26: The Mount Cory Mining Co. is making arrangements to start their immense reduction works, four miles from here. The company has a large amount of pay ore on the dump and plenty more in sight in the mine. When they do start up the mill, which is expected to be about April 1st, it will be a long and continuous run, as the mine never looked so well as it does at present. It will give employment to a number of men and create better times generally. The company is one of the best on the coast, and their management always meets with success. It is reasonable to expect that this coming season will be one of increased prosperity for this section.

Tybo District.

DEVELOPMENT.—Cor. Belmont Courier, Feb. 26: All who are here are steadily at work and generally with good results. Mr. Dimick is making important developments in his property, and should all the work now in progress show such bodies of ore as there is every reason to believe probable, his mine

will become one of the permanent bullion-producers of the county. He has now at work seven or eight men, part of whom are slaking on a fine body of high-grade ore, and the others are driving a crosscut from his old shaft to tap the present ledge at a depth of 235 feet. When this work is completed he will be in condition to take out ore very rapidly. Gilmore Brothers are steadily working on their mine, and are encountering some fine ore with better prospects for the future. Mr. Trowbridge is having the hoisting engine and machinery put in thorough repair preparatory to the hoisting of the water from the 20 mine and the further exploration of the mine below its present workings. If the developments below the 8th level, 400 feet from the surface, are such as the past history of the mine makes almost a certainty, it means for Tybo another and better and more permanent lease of life than it has yet enjoyed. It means work for many men for many years to come and the addition of a continual stream of bullion to the product of Nye county. Mr. Trowbridge is also taking out of the old stopes of the mine large quantities of low-grade ore, running from 10 to 18 ounces per ton, which he proposes to work some time soon after May 1st. To most of your readers this grade of ore may seem to be absolutely valueless, but the time has come when mining men must look more to the large bodies of low-grade ores for future dividends than to the occasional bodies of rich ores that are found in our country.

Tuscarora District.

BELLE ISLE.—*Times-Review*, Feb. 26: Line crosscut, 150-foot level, extended eight feet; total length 79 feet. The rock is very hard in both places.

NORTH BELLE ISLE.—North drift from No. 1 crosscut, 150-foot level, advanced 8 feet. The face shows the vein badly broken and very little ore. There is no material change to note.

NAVAJO.—Drift north from No. 1 winze, 350-foot level, has been advanced six feet; total distance, 22 feet. The face shows about two inches of good ore.

NEVADA QUEEN.—Since last report, work in the shaft has been suspended on account of the increasing flow of water. During the week, a station at the 200-foot level has been opened and will be finished in a few days.

Wild Rose District.

PARADISE VALLEY MIN. CO.—*Silver State*, Feb. 25: For week ending Feb. 21, milling ore produced, 31 tons and 1500 pounds. Average assay value per ton, 43.94 oz. silver; 0.26 oz. gold. Mill run 160 hours and reduced 105 tons. Mill work—Three Huntington centrifugal roller mills; six Triumph concentrators. Concentrates produced, 400 sacks, 32,760 pounds, par value \$5978.60, which was shipped to Boston and Colorado Smelting Co., Argo. Number of men on pay-roll, 98. During the week we have connected No. 5 winze, No. 4 tunnel, with the north drift 100-foot level, which has greatly improved the air, giving us a good steady current. The face of No. 5 tunnel is looking better, having small bunches of fair-grade ore, and indicates that we are on top of an ore body. Satisfactory progress continues at all points and everything is going smoothly at the mine and mill.

ARIZONA.

CHAUTAUQUA MOUNTAIN.—*Phoenix Herald*, Feb. 20: Among the great mining centers of Arizona is Chautauqua mountain, 35 miles north of Phoenix, on Cave creek. At the base of this mountain is the justly celebrated Phoenix mine, in which it is estimated there are over 1,000,000 tons of \$12 ore developed. The substratum of the mountain, as shown by the southern exposure, is sienite. This is capped with black slate for several hundred feet in depth, which, in the great upheaval that projected this center above the surrounding peaks, assumed a pitch corresponding with and forming the northern face of the mountain, the acclivity of which is about 35 degrees from the horizontal. This slate is seamed and scarred with a system of auriferous quartz veins from its apex to the base of the canyon at its northern base. On the summit is the great Chautauqua mine that has an exposure of 100,000 tons of ore, developed by the weathering of nature during the cycles of centuries. The Yellow Jacket mine is the northern extension of the Chautauqua, and while not having so great an exposure of ore, shows several large veins that can be traced through its whole extent. Three reports upon these mines made respectively by I. M. Taylor, of San Francisco, Sam Mc Masters (now dead), former superintendent of Haggins & Hearst's celebrated Deadwood mines in Dakota, and H. W. Kearsing, at one time assayer of the United States mint at San Francisco, fixed the average value of the ore at \$17.50 per ton, Mc Masters making it \$22; Taylor, \$17.50; and Kearsing, \$17. Adjoining and parallel with these mines are the Washington, Live Yankee, Lucille and Esmeralda, with extensions across the canyon, north, known as the Como and Denver. Major Ingalls, who returned from there last evening, having gone up with J. B. Norton, a San Francisco expert, brought home with him several sacks of ore from the Chautauqua, Washington, Live Yankee, et al., that is exceedingly rich, much of it showing brightly with free gold. This ore was shipped to Col. G. W. Lechner at Denver, Colorado, to-day, who has parties about to close with him for a portion, if not all, of the mines named. Mr. Norton emphatically corroborates all former reports on the mines of Chautauqua mountain, which is another proof that the *Herald* is correct in its claims for the value of the gold mines of Maricopa county and particularly Cave creek.

GREAT BASIN.—*Mohave Miner*, Feb. 26: We hear that Judge Schaefer has struck it rich on one of his Gold Basin claims. Sol. Rowe, John Fox, R. G. Patterson and other Gold Basin miners are doing well. Jim Mulligan had a lot of ore from the Flagstaff mine put through the sampling process. George Uetz brought up a load of ore from the Sandy country, but we did not hear how it milled. Bob Patterson is running his steam apparatus out at Grass Springs again on ore from his Gold Basin mines. Victor Coshina brought in about half a ton of high-grade galena ore from the Winchester mine at Stockton Hill last Thursday. Mr. Shippey came down from Stockton a day or two since, with five sacks of wonderfully rich ore, and left with a good-sized check in his pocket. P. Hatch had a carload of ore from the Indian Boy run through the sampling works last week, and also a small lot of rich ore from the same mine. William Miller is again at work on the Crescent mine, Peacock district, and sent in about five tons of very good ore from Wallapai

Siding last week which netted him a handsome sum. Mr. Miller is one of our most successful miners. Brown and Miller came in again last week with about a ton and a half of ore from their claim in the Weaver district, near El Dorado canyon, for which the sampling works paid them in the neighborhood of \$700. As these two miners average a trip about every two weeks with this grade of ore, they should be accumulating wealth.

RICHMOND BASIN.—*Arizona Silver Belt*, Feb. 26: Sheriff Hodson, from Richmond Basin, reports fair progress in the development of the Equity mine, owned by Bud Woodson, S. Klein and himself. They have some ore, but wish to develop the property in a thorough manner, and will do considerable more deadwork before stopping. They are sinking a new shaft and will soon begin a drift. Other miners at the Basin are doing well. Sam Sands, in sinking on his mine, went through eight feet of ore, and he is now drifting. The ore will go from \$500 to \$1000 per ton. John Cadman is also working his mine successfully.

COLORADO.

SALES.—*Denver Tribune-Republican*, Feb. 23: The Frontenac and Searle of Gilpin county, which were offered in London for \$750,000, are reported sold. Tally two. The United States placers, which sold for the same amount, constituted tally one. Now let the Cinnamon Mountain and the Gilpin county placers, which are offered in London at still larger figures, be sold, and Colorado will get a black eye which will prevent the sale of another mine in that market for a dozen years.

BOG IRON.—*La Plata Miner*, Feb. 19: In the vast bog-iron beds in the vicinity of Del Mino, there are thousands of tons of the finest kind of fluxing material for smelting purposes. It will probably be utilized by the San Juan and New York smelter at Durango, which has heretofore used mainly the Leadville Breese iron ore. This ore is getting rather scarce, and some difficulty is used in securing a supply, and this is one of the reasons for the change. Another reason is that the Interstate Commerce bill puts a stop to the special rates which this smelter has received on this ore. The Cement creek bog iron contains from two-tenths of an ounce to one ounce gold per ton.

SILVER BELL.—We understand from unimpeachable authority that the famous Silver Bell, the pride of the district, is to be sold. It has been quietly mooted for some time that the property was soon to change hands, but none thought the transaction was so soon to take place. The intending purchaser is the "Standard Oil Co."—or, rather, Crawford, Hammond & Co., of the Yankee Girl. Mr. W. H. Harvey came to the mine on the 10th, and paid all of his employees up to that date. He left on Sunday for Denver to complete the negotiations for the sale.

THE GUSTON.—The Guston is turning out its regular quota of ore. The ore seam holds its width in a fashion that is very pleasing to Mr. Gray. The fourth level has been started, and they are rubbing the drift with all possible speed toward the ore chimney. Meanwhile the shaft is continued on down to the projected fifth station, which will likely be the last station to be put in this shaft, as a new double-compartment shaft is to be begun early in the spring.

THE COPPER KING has about 75 tons of ore on the dump, and the pile is being added to every day. The mine is looking splendidly, and there seems to be no end to the ore. Yesterday, the crew ran on to another of the "open sesame" caves, which brings another bonanza in sight for the owners, Col. Pat Cahill and Count de la Ressoubes. With a continuance of such luck, they will not be long getting that \$50,000.

IDAHO.

SOUTH SIDE PROSPECTS.—*Coeur d'Alene Record*, Feb. 19: Placer miners along Trail, Potosi, and Pony gulches are jubilant over the prospects for this spring. The enormous amount of snow insures a plentiful supply of water until late in the season, and the owners of many of the best claims have been as busy as bees all winter building flumes and ditches and making preparations to conduct operations on an extensive scale.

TRAIL CREEK.—Among the Trail creek claims which are almost sure to contribute greatly to the Coeur d'Alene gold product of '87 are the McCauley, Nickerson, Horseshoe (segregated), Bosse or French claim, Myrtle, Miller and Black Hills. The last named will be the principal scene of the extensive operations of the Trail Creek Bedrock Flume Company, in charge of John Hermann. On the Montana bar claim, already noted for its outputs, the Van Dorn brothers have run an open cut to bedrock and expect to get more gold this spring than ever before.

POTOSI GULCH.—All winter Potosi gulch has been a scene of considerable activity. The owners of the Gallivan claim have done an immense amount of work and everything is now in readiness for active hydraulic operations as soon as they get sufficient water. The Mills claim is prepared for sluicing. Shuster and Range have dug a ditch one mile long to carry water for hydraulicking, and have built a flume 13 inches wide and 600 feet long. They have some of the best ground in the gulch and their prospects for a big run this spring are first-class. Hall & Co. have put in a flume for working their bar ground and are likely to be amply rewarded for all their outlay of time and money. At the mouth of the gulch Heller & Co. are prepared to make things lively piping rich gravel through their flume as soon as the rush of water comes.

PONY GULCH.—Up to the present time the profits derived from placer mining in Pony gulch have been slight. There is gold there, lots of it, but flumes and hydraulic appliances are necessary to make it pay. These the best claims now have, and the placer output this season is likely to be considerable. Since early last summer, when several large gold ledges were found, the *Record* has made frequent mention of the quartz prospects of Pony gulch. Considerable work has been done quietly by a few men and the results of their labors have astonished all who have gained a knowledge of the facts. Parties who have lately visited ledges where work is now in progress say that fine specimens of free gold are thrown out by almost every shot. The most sanguine ones predict that Pony

gulch will prove to be the great gold quartz gulch of Coeur d'Alene and that some of the ledges will rival the richness of the marvelous Treasure Box, while greatly exceeding it in size.

FLINT DISTRICT.—*Idaho Avalanche*, Feb. 26: We hear that the Idaho Mining Co., of Flint mining district, is now sinking three shafts from the bottom of the level of the Perseverance mine, and that ere long they will put hoisting works on one of the shafts. The company is also running a tunnel from the Leviathan to cut the Rising Star. It is the intention to work the Leviathan, Rising Star and Perseverance through one tunnel. Work is still progressing on the Star and the Evening. Fully 125 men are working in and around Flint. By spring it is expected that the mines will be well opened and the reduction works in operation. Mr. Stanton deserves great credit for the manner in which he has conducted the affairs of the company.

THE DURANGO GROUP.—*Wood River Times*, Feb. 23: The ore in the Durango not only holds out, but begins to justify the expectation that an ore body is not far distant. When first struck, a few weeks ago, only lumps or bunches of carbonates, carrying specks of galena, were found; these increased in frequency until a seam of galena was cut; a six-inch vein of galena, flanked on either side by a good width of concentrating ore, followed the seam, and the kidneys now give every indication of lengthening and widening into a large body which pitches to the south—or away from the Bullion-Ophir workings. Work in the Durango is prosecuted on three levels, which are respectively at depths of 300, 400, and 500 feet from the surface. All three levels are running in the direction of the ore body. As soon as that point is reached on either level, the others will be pushed as rapidly as possible—so that the property will be at once ready to ship a large quantity of ore. There will then be all of 3000 feet of "backs" ready for stamping. The Durango group is a monster property, as it includes all of 20 claims. That is, fully this number of claims owned by the same individuals are being prospected, or will be prospected, by the Durango workings. The principal owners are Craig Chambers, the Salt Lake millionaire, and Professor Jenney.

THE MINING OUTLOOK.—*Statesman*, Feb. 23: The outlook in all the mining camps in Idaho is very encouraging, and the indications point to a general revival in a number of camps where work has been suspended for one or more years, and increased productions in other camps. The sale of the Charles Dickens mine and the settlement of some lawsuits in the Bayshore district promise well for these camps; the new 50-stamp mill at Rocky Bar will give new life to that camp, the recent developments and additions of new machinery in camps in Owyhee county; the recent sale to capitalists of a number of mines in Washington county; the discovery of rich ledges in the Sheep Mountain and North Boise districts, all indicate that great activity will prevail in all the mining camps in Idaho next season.

OREGON.

GALICE CREEK.—*Oregon Sentinel*, Feb. 20: Chas. Saunders and Geo. Sturgeon came out from Galice creek last week. They report deep snow in that section and the miners jubilant. Mr. Saunders says there are extensive mines of both quartz and placer in that section, which, up to this time, have not been explored. He predicts a bright future for that section, because, he says, the mines are rich and time will bring capital which is alone necessary to make Galice creek one of the most important mining camps on the coast.

RICH STRIKE.—*Bedrock Democrat*, Feb. 26: We are pleased to know that Frank Skelton, an old resident of Baker county, has at last struck it rich in the Granite district. He has been energetically at work since last fall on a quartz lode and now comes a well-authenticated report that he has at last struck a vein of quartz that assays "way up." In fact that he has been enabled by means of a hand-mill to take out considerable of the shining metal.

GRANITE.—C. S. Miller, who it can be said has few equals as far as energy and perseverance are concerned, returned from Granite mining district yesterday. During his brief sojourn in the mountains his mode of traveling was by means of snowshoes, and judging from the many samples of quartz brought out with him, we think his trip was not without good results. Mr. Miller has great faith in the future of this district as a mining center, and from his long experience in mining on this coast, we think he is good authority.

NOTES.—*Jacksonville Times*, Feb. 26: Extensive mining operations will probably be resumed in Wagner creek district before long. The snow which lies in the mountains in great heaps will serve to extend the mining season a considerable period. Considerable work is being done at Hays & McGruder's diggings on Rogue river. C. O. Bigelow, of Williamsburg, is operating his hydraulic mines on an extensive scale this season, and will make a good showing. Another ledge of quartz has been struck in the Jacksonville Milling and Mining Company's tunnel on Timber gulch. F. Houatt and others are taking 150 tons of quartz out of the El Dorado ledge, owned by McKenzie & Co., which will be crushed by Klippel & Baume's mill as soon as the roads are in condition. A great many placers that have never been worked before will be mined this season. There is plenty of good ground in this region which is yet unworked, because enough water for that purpose is not available.

NEW MEXICO.

HANSONBURG DISTRICT.—*Socorro Bulletin*, Feb. 19: As a pointer of the renewed interest which is being manifested in the mines of this county, we cite the case of the Compromise mine at Hansonburg district, which was bonded from its owners, Chas. Blanchard, J. K. Lintz and Jeff Reynolds, for 12 months, by F. Wilson, of this city. The bond is for \$20,000. The latter gentleman last Monday dispatched miners to the mine. The blasts of the Compromise will awaken the echoes, which have been silent for so long, among the rocky gulches and summits of the mining districts of the Oscuras. Work will be prosecuted without intermission, and as the workings possess a full face of rich argentiferous and auriferous copper ore, the product will be shipped via the Carthage branch for treatment. The extension of this railroad artery to White Oaks

would be the signal for the resumption of work throughout the Hansonburg, Oscura, San Antonio, Little Burro, and other mining districts which have lain dormant since 1881, owing to the difficulties of access and want of economical transportation of mineral. We are happy to note this renewed activity in these camps, which will be accelerated by the railroad to White Oaks, and by the consummation of the extension of the branch from Magdalena to Albia will result at least in doubling the bullion and mineral product of this county. The Graphic smelter is now running its three shafts at full blast. The product of the Billing works during the month of January, 1887, was 600 tons of high-grade bullion. New discoveries of high-grade ore continue to be made almost every week in the Nogal and Bonito mining districts. The railroad has acted on our suggestion and constructed a switch to the slag dump of the Graphic smelter, and are now using the slag for ballast on their road. They will also, we are told, do the same at the Billing works.

IRON.—*Rio Grande Republican*, Feb. 26: Geo. Brown came in from the San Diego mountains the first of the week, where he has been locating an iron property. The ledge, he states, is an immense one, being several hundred feet in width, and the iron body is simply inexhaustible. Coal is said to exist in the same locality, and it remains for some enterprising company to take the matter in hand and make Dona Ana an iron-producing county as well as a gold, silver, copper and lead producer.

MONTANA.

THE ANACONDA.—*Butte Miner*, Feb. 23: Good news is received in regard to the Anaconda Co. A rumor was on the street early yesterday in regard to preparations being made at the Anaconda mine for the resumption of operations. Marcus Daly was at the smelter, and when approached upon the subject, said: "As a general thing I am opposed to this promiscuous interfering business. In this matter, however, I realize that the public in Butte cannot but be greatly interested. The Anaconda employs 400 men in Butte, and more than that in Anaconda, and so a large number of people must be anxiously watching for news in regard to its operations. Yes, the smelter will be started up this evening. We have now on hand about 1000 tons of coal, and have satisfactory assurances that more will be forthcoming when needed. We shall start up only half of the furnaces to-night. While there is the least uncertainty in regard to the supply of coal, we cannot make any experiments. Half the furnaces in each of the two smelter buildings will be started up to-night, and the other half as soon as our coal order is filled. The concentrator will begin operations about Wednesday or Thursday, and the mine at the same time." The reasons for the delay in starting up the mine and concentrator are that a supply of ore and concentrates is already on hand sufficient to run the furnaces several days. The new steam stamp and the automatic delivery of ore have greatly facilitated the production of the concentrator, and it is now able to keep ahead of the smelter all the time. There was general rejoicing in Anaconda last night as the news was passed from mouth to mouth.

AT WORK AGAIN.—*Butte Miner*, Feb. 26: As reported in Monday morning's *Miner*, the Anaconda Co. decided to begin work again. Half the furnaces were started up Monday evening, and the intention was stated of starting up the concentrator and mine in a few days. For the purpose of learning the further movements in this matter, a call was made yesterday on President Dana, of the Montana Union, who said: "The concentrator of the Anaconda will start to-morrow, as announced. We begin to-morrow to deliver ore from three of the company's mines, the Matte, the Anaconda and one other—I think the Wake Up Jim. For the present we will send over about 30 or 40 cars per day, amounting in all to about 700 or 800 tons daily. The smelter already has on hand about 2000 tons of ore, as we have been delivering a little right along. We shall gradually begin to put back the men that we were compelled to let go on account of the shut-down, and I think in a short time we will be working the full force as before. We have already asked for our five engines from the Union Pacific, which we let go down to help out below during the snow blockade."

UTAH.

PARK CITY.—*Record*, Feb. 20: There is no use concealing the foregone conclusion that Park City will have a big merited mining boom the coming spring and summer. The past record of the Park, present and prospective operations on both old and new properties, indicate a boom equal to any known for good and permanent results. The press of the country seem to realize this and are making it known. The new body of ore in the Apex lower tunnel is holding out surprisingly well in extent and value. Ten tons of ore are taken out daily, and as soon as the roads permit extensive hauling the output can be increased to 60 tons a day.

THE NEW STRIKE.—Early this week G. J. Barry, who has charge of the working of the Silas Reed group on Pioneer ridge, sent word to the heirs of the deceased Dr. Reed of the rich strike in the Silver Age tunnel. The find is big and valuable to the owners, who have spent much money on the property. Further details, other than that the vein of rich sulphuret ore is two feet in width, were not obtainable. It is not likely that the strike will be developed much until A. C. Anthony, executor of the Reed estate, comes from Boston to inspect the property.

REVIEW.—*Salt Lake Tribune*, Feb. 25: The receipts of ore and bullion in this city for the week ending the 23d inclusive, were \$100,620.74 in bullion and \$30,247.67 in ore, a total of \$130,868.41. For the previous week the receipts were \$64,210.98, of which \$101,045.88 was ore and \$63,165.10 was bullion. The output of the Ontario for the week was 24,280 fine ounces, and ore sales amounting to \$8832.37, a total of \$33,112.37. The Daly product for the week was 13 bars of bullion, 18,435.08 fine ounces, and \$4505.03 of ore sales, a total of \$22,940.11. Fine bar receipts for the week were \$19,014.35; base bullion, \$10,200; gold bars, \$2871; dore bars, \$1900. The Hanauer smelter produced for the week \$18,055 in bullion. Nothing can be learned locally of the Horn Silver, except reports that force and salaries are being reduced. The result would naturally be an even smaller output than that of the past.

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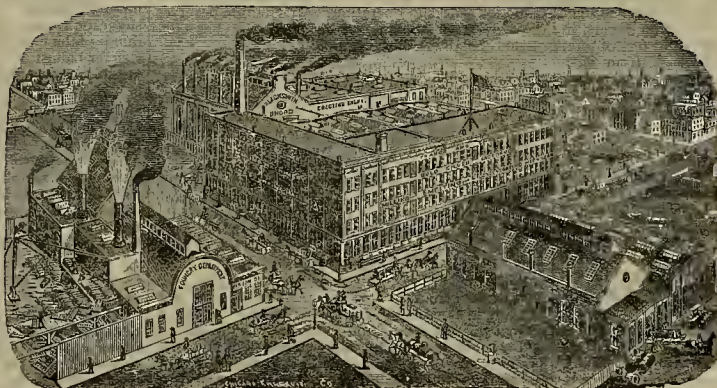
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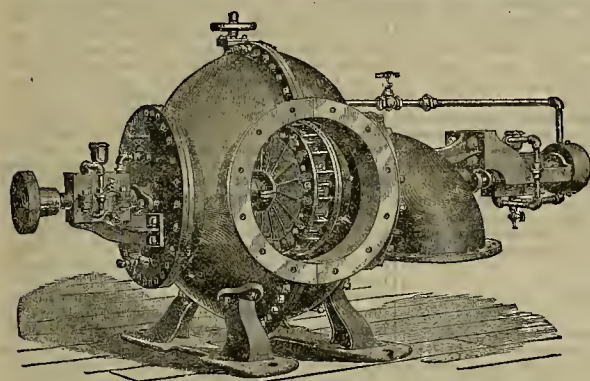
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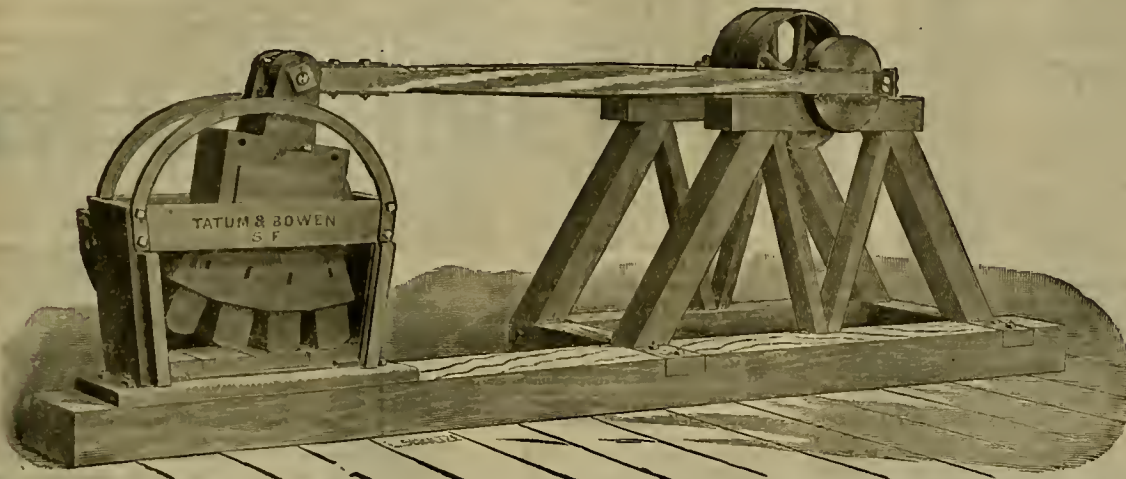
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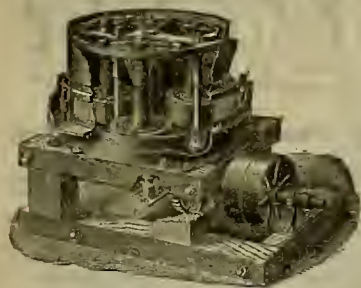
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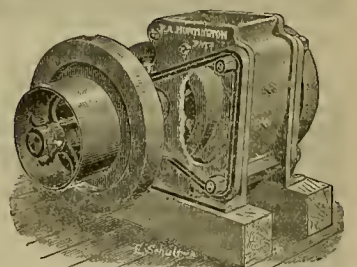
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FOR WEEK ENDING FEBRUARY 22, 1887.

- 358,185.—TUBULAR LANTERN—Emil Boesch, S. F.
 358,017.—TREE PROP—H. B. Cole, Riverside, Cal.
 358,105.—BAYONET—H. H. Conklin, Eureka, Nev.
 358,190.—CAR COUPLING—W. S. Doan, Sacramento.
 358,112.—WATER FILTER—Fjord & Broders, S. F.
 358,035.—CARTRIDGE LOADER—H. T. Hazard, Los Angeles, Cal.
 358,119.—SLATE WASHER—P. D. Horton, Oakland, Cal.
 358,271.—BOILER—E. Hosford, Oakland, Cal.
 358,294.—PULVERIZER—F. Payne, East Portland, Ogn.
 358,071.—FIREARM—J. W. Redfield, Glendale, Ogn.
 358,222.—STOP VALVE—J. Richards, S. F.
 358,170.—PROPELLING APPARATUS FOR VESSELS—C. A. Smith, S. F.
 358,089.—TRANSON VENTILATOR—J. P. Tierney, Oakland, Cal.

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TELEPHONE ELECTRIC RAILWAY CO., Feb. 27. Object, to engage in electric street railway operation. Capital stock, \$1,000,000. Directors—Julius Goetz, F. M. Speed, R. A. Wilson, Geo. H. Hoppes and F. W. Brown.

PACIFIC PAPER CO., Feb. 27. Capital stock, \$25,000. Directors—F. W. Ainsworth, G. H. Bartlett, F. R. Noyes, B. Noyes and Smith Bartlett.

CARY M. CO., March 2. Location, California. Capital stock, \$1,200,000. Directors—Vernon Wilson, Fred L. Lipman, Amos W. Huggins, Joseph Newbauer, Jr., and John de Vaul, Jr.

WOMAN'S EXCHANGE, March 3. The objects are the receptive exhibition and sale of all articles of woman's work, except such as shall be deemed by the officers of the society too perishable to be placed in the rooms of the society. The officers are: President, Rosalie Kaufman; secretary, K. P. Birdsall; Directors—Mary A. Swift, Emily B. Hopkins, Ellen L. Mayes, Ellen M. Wetherbee, Annie B. Dodge, Sarah Sloss, Matilda Castle, Lucille B. Forman, Katherine P. Birdsall, Cornelia F. Curry and L. Ashe. There is no capital stock.

CONSOLIDATED SEGREGATED BELCHER M. CO., March 3. Location, Nevada. Capital stock, \$5,000,000. Directors—Maurice Schmitt, M. P. Hall, C. A. Schmitt, A. Herman and Thomas Cole.

Mining Share Market.

Business in mining shares is comparatively light just now. There is not much news of note from the Comstock. In Bullion, the east drift from the station on the 200 level in the Croesus shaft is out a total length of 260 feet and is still showing low-grade quartz in the face. The west crosscut from the same station is up to the West Potosi east line, and will be carried into that ground by the management of that company. In Yellow Jacket during this current week 1700 tons of ore were extracted from above the 1300 level and shipped to the Brunswick mill. Extensive explorations are in progress between the sagebrush level and the 900.

The Consolidated California and Virginia has declared a dividend of 50 cents per share.

It is stated that some new mines in the Quijotoa region, Arizona, will soon be purchased and shares may be put upon the market.

Bullion Shipments.

We quote shipments since our last, and shall be eased to receive further reports:

Margat Ann, Feb. 27, \$4320; Moulton, 26, \$16,080; Pyrenees, 26, \$9000; Hanauer, 22, \$2732; Alice, 22, \$14,479; Hanauer, 24, \$3350; Bannock, 24, \$4100; Hanauer, 25, \$1900; 26, \$1900; Cons. California and Virginia, 27, \$48,000; total for month to that date, \$195,820; Eureka Consolidated, 27, \$22,048; total for month, \$65,000; Head Center and Tranquility, March 1, \$5321; Standard, 1, \$5612; Wells, Fargo & Co., shipped from Salt Lake last week \$73,881 in bullion; McCormick & Co., \$31,705; T. R. Jones & Co., \$10,797; Union National Bank, \$14,479.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARRN C. HOAG—California.
 G. W. INGLE—Arizona.
 E. L. RICHARDS—San Diego Co.
 R. G. HUSTON—Los Angeles and San Bernardino Cos.
 GEO. McDOWELL—Fresno and Tulare Cos.
 M. S. PRINE—San Joaquin and Alameda Cos.
 T. P. POWERS—Napa and Sonoma Cos.
 J. L. DOYLE—Tuolumne and Calaveras Cos.
 W. J. FREEMAN—Sierra and Butte Cos.
 A. J. HARR—El Dorado Co.

EXPERIMENTS with the new explosive, which have been made under the supervision of the Russian Government, have been attended with great success. It is stated that the explosive possesses 15 times greater destructive power than gunpowder, and does not produce any smoke.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Con M Co	Nevada.	21.	50.	Jan 12.	Feb 17.	Mar 10.	L. Osborn.	393 Montgomery St
Andes S M Co	Nevada.	31.	25.	Jan 24.	Feb 28.	Mar 23.	B. Burris.	309 Montgomery St
Alta S M Co	Nevada.	35.	60.	Feb 9.	Mar 15.	Apr 5.	W. H. Watson.	302 Montgomery St
Bodie Con M Co	California.	5.	50.	Jan 24.	Feb 28.	Mar 28.	G. W. Sessions.	309 Montgomery St
Bullion M Co	Nevada.	32.	40.	Jan 22.	Mar 1.	Mar 17.	R. P. Grayson.	327 Pine St
Benton Con M Co	Nevada.	17.	20.	Jan 28.	Mar 21.	Mar 21.	W. H. Watson.	302 Montgomery St
Caledonia M Co	Nevada.	42.	15.	Mar 1.	Apr 5.	Apr 26.	A. S. Gooch.	414 California St
Camp Creek Placer M Co.	California.	1.	10.	Jan 20.	Mar 10.	Apr 14.	G. W. Miller.	306 Pine St
Four Hills Mine.	California.	1.	25.	Jan 22.	Feb 28.	Mar 21.	J. S. Moody.	328 Montgomery St
Golden Fleece Gravel M Co.	California.	3.	10.	Jan 27.	Mar 7.	Mar 25.	W. J. Gleson.	310 Phelan Block
Hubert Concentrator Co.	California.	1.	10.	Jan 17.	Feb 20.	Mar 14.	M. Livingston.	320 Montgomery St
Hazard Gravel M Co.	California.	1.	03.	Jan 26.	Mar 1.	Mar 23.	J. T. McGehegan.	323 Pine St
Kincaid Flat M Co	California.	1.	2.00.	Jan 5.	Feb 14.	Mar 7.	W. H. Keith.	432 California St
Lone Jack M Co	California.	1.	05.	Jan 27.	Mar 7.	Mar 23.	J. M. Ruffington.	309 California St
Ledy Washington M Co.	Nevada.	6.	20.	Jan 28.	Mar 7.	Mar 23.	W. H. Watson.	302 Montgomery St
Mennhattan S M Co.	Nevada.	2.	1.00.	Feb 2.	Mar 7.	Mar 22.	J. Crockett.	327 Pine St
Mayflower G M Co.	California.	34.	25.	Jan 19.	Feb 26.	Mar 18.	J. Mo izio.	328 Montgomery St
North Belle Isle M Co.	Nevada.	11.	50.	Jan 12.	Feb 15.	Mar 9.	J. W. Pew.	310 Pine St
Loose Con T Co.	California.	10.	01.	Jan 1.	Feb 5.	Feb 25.	T. J. Mitchell.	Grass Valley
O'Brien M Co.	Nevada.	57.	30.	Jan 21.	Feb 25.	Mar 11.	G. D. Edwards.	414 California St
Occidental M Co.	Nevada.	3.	40.	Feb 3.	Mer 10.	Mar 31.	A. K. Durbow.	333 Montgomery St
Phelps Manufacturing Co.	California.	1.	5.03.	Feb 12.	Mar 21.	Apr 5.	W. H. Phelps.	17 Drumm St
Phoenix Con M Co.	California.	2.	1.43.	Jan 25.	Mar 5.	Mar 28.	C. Collichon.	516 California St
Pneumatic M Co.	California.	2.	20.	Jan 4.	Feb 14.	Mar 8.	H. Pichol.	320 Sansome St
Spring Valley M Co.	California.	2.	34.	Jan 22.	Mar 5.	Apr 4.	H. Pichol.	320 Sansome St
Sierra Iron Co.	California.	5.	2.50.	Feb 17.	Mar 30.	Apr 23.	H. P. Bush.	431 California St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Alabama, Humboldt & Belley Co.	Nevada.	W. H. Watson.	302 Montgomery St.	Annual. Feb 25
Asco-Mexican M Co.	Mexico.	G. A. Moore.	217 Sansome St.	Annual. Dec 25
Cosmopolitan M Co.	Nevada.	B. Burris.	309 Montgomery St.	Annual. Mar 8
Chollar M Co.	Nevada.	O. E. Elliott.	309 Montgomery St.	Annual. Mar 15
Columbus Con M Co.	Nevada.	J. M. Ruffington.	309 California St.	Annual. Mar 15
Hale & Norcross M Co.	Nevada.	J. F. Lightner.	309 Montgomery St.	Annual. Mar 5
Nevada S M Co.	Nevada.	E. M. Hall.	309 Montgomery St.	Annual. Mar 9
Potosi M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	Annual. Mar 9
Sutro Tunnel Co.	Nevada.	P. W. Ames.	320 Sansome St.	Annual. Mar 7

LATEST DIVIDENDS—WITHIN THREE MONTHS.

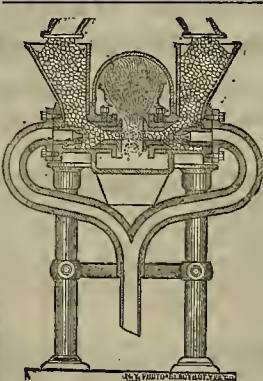
NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Vm Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50.	Mar 4
Martin White M Co.	Nevada.	J. Seyville.	309 Montgomery St.	25.	Dec 30
Pareidie Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	10.	Nov 30
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Feb 15

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 10.	WEEK ENDING Feb. 17.	WEEK ENDING Feb. 24.	WEEK ENDING Mar. 3.
Alpha.	2.25	2.50	3.00	3.10
Andes.	1.30	1.50	1.35	1.50
Alta.	.75	.90	.90	.65
Argenta.	.15	.15	.15	.15
Belcher.	2.50	3.00	2.40	2.50
Brophy.	.30	.75	.70	.35
East & Belcher.	.30	.75	.70	.35
Bullion.	2.00	2.00	2.40	2.50
Baltimore.	.50	.85	.75	.80
Belle Isle.	.30	.40	.25	.35
Bodie Con.	1.95	2.00	1.95	2.00
Bodie Tunnel.	.40	.45	.35	.50
Bulwer.	1.15	1.30	1.20	1.15
Con. Va. & Cal.	.91	.22	.12	.15
Challenger.	1.75	2.00	1.95	2.25
Chollar.	.55	.75	.80	.75
Confidence.	7.50	7.75	5.00	6.00
Con. Imperial.	1.40	1.50	1.55	1.60
Caledonia.	.40	.50	.45	.50
Con. Pacific.	.40	.50	.45	.50
Crown Point.	3.75	4.10	4.00	4.20
Crocker.	.90	1.10	1.00	.875
Central.	.40	.45	.50	.55
Dudley.	.100	.110	.100	.110
East & B. & V.	1.00	1.10	1.00	1.10
Eureka Con.	1.35	1.50	1.40	1.50
Exchequer.	1.35	1.50	1.40	1.50
Grand Prize.	4.55	5.15	4.50	5.25
Gould & Curry.	5.15	5.25	5.00	5.25
Hale & Norcross.	.51	.26	.25	.30
Holmes.	.25	.25	.25	.25
Independence.	.25	.25	.25	.25
Iowa.	1.30	.95	1.20	.65
Julia.	.50	.70	.55	.70
Justice.	1.40	1.55	1.50	1.55
Kentucky.	1.60	1.50	1.55	1.60
Lady Wash.	.20	.25	.20	.25
Martin White.	2.40	2.55	2.50	2.60
Mono.	3.75	4.00	4.00	4.00
Mt. Diablo.	3.75	4.00	4.00	4.00
Northern Belle.	.95	1.05	.90	1.00
Nevejo.	3.75	4.25	4.00	4.75
North Belle Isle.	1.50	1.60	1.50	1.55
Nor. Queen.	.40	.50	.45	.50
North G. & O.	.40	.50	.45	.50
Occidental.	2.50	3.50	2.75	3.00
Ophir.	.10	.12	.11	.12
Overman.	1.05	1.15	1.00	1.10
Potosi.	.75	.90	.73	.85
Peerless.	.70	.75	.60	.65
Peer.	.45	.35	.40	.50
P. Sheridan.	.15	.10	.10	.10
Silver Star.	6.00	5.50	5.00	5.00
Savage.	5.00	5.50	5.00	5.00
Seg. Belcher.	4.65	5.25	4.95	5.10
Sierra Nevada.	.25	.35	.30	.40
Silver Hill.	.75	1.00	.90	.75
Silver King.	.75	1.00	.90	.75
Scorpion.	.15	.20	.15	.20
Syndicate.	4.00	4.70	4.20	4.50
Union Con.	6.00	5.50	5.00	5.25
Utah.	4.25	5.00	4.50	4.75
Yellow Jacket.	4.25	5.00	4.50	4.75

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some responsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.



Sectional View of Pulverizer.

PNEUMATIC PULVERIZER.

The principle of pulverization consists in the employment of two

POWERFUL OPPOSING CURRENTS

Of dry super-heated steam, so arranged that they continuously charge themselves with crushed or granulated material, and by the great force and velocity of the steam currents the minerals are dashed against each other with such power of concussion as to cause the hardest ores to be pulverized to any degree of fineness desired. The high temperature of the super-heated steam currents employed, through which every minute particle of ore must pass, causes them to become very hot and dry, which produces a beneficial effect upon Sulphurets and ores containing rusty Gold. The light weight and simplicity of construction of the Pulverizer, the extreme small and inexpensive wearing parts, are the WONDER and SURPRISE of all who witness its operation. The Company is prepared to furnish complete plants for pulverizing

10 TO 200 TONS PER DAY,

Including a Sectional Steam Boiler supplying all the power required.

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2 and 4 Stone Street, NEW YORK.

Write for Particulars.

New York Metal Market.

Telegraphic advice dated March 3d give the following New York prices:

BAR SILVER—\$1.01 1/2 per oz.
 BORAX—\$4.00 c.
 COPPER—\$10.11.
 LEAD—\$4.37 1/2.
 QUICKSILVER—\$3.00 c.

The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Dull, spot closing at \$10.80 c. —. Transferable Notices (Lake) issued at \$10.75 c. —. Transferable Notices (Chili Bars) issued at \$10.10 c. —. Orford—Steady at \$4.45 c. 4.55 c. spot. Transferable Notices issued at \$4.52 c. —.
 This Firm at \$22.45 c. 22.55 c. Transferable notices issued at \$22.55 c. —.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, \$22.50 c. 23.00 c.; Billiton Tin, \$23.10 c. 23.40 c.; Banca Tin, \$23.15 c. 23.50 c.; Baltimore Copper, \$9.75 c. 10.15 c.; Banca Copper, \$10.00 c. 10.25 c.; P. S. C. Copper, \$10.00 c. 10.25 c.; Foreign Lead, \$4.80 c. 4.95 c.; Foreign Spelter, \$4.80 c. 4.95 c. —.

MAKERS' PRICES—At tide-water. 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$21.00 c. 22.50 c.; No. 2, \$20.00 c. 21.00 c.; Grey Forge, \$17.50 c. 19.00 c.; Hudson River, Grade No. 1, \$21.00 c. 22.00 c.; No. 2, \$20.00 c. 21.00 c.; Grey Forge, \$15.00 c. 15.25 c.; Southern, Grade No. 1, — c. — c.; No. 2, — c. — c.; Grey Forge, — c. — c. —.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

ASSESSMENT NOTICE.

The Phelps Manufacturing Company.—Location of principal place of business, San Francisco, California. Location of works, San Francisco, Cal.

NOTICE is hereby given, that at a meeting of the Board of Trustees, held on the 12th day of February, 1887, an assessment (No. 1) of Five Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary of the Company, 17 Drumm street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 21st day of March, 1887, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Tuesday, the 5th day of April, 1887, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Trustees.

W. H. PHELPS, Secretary.

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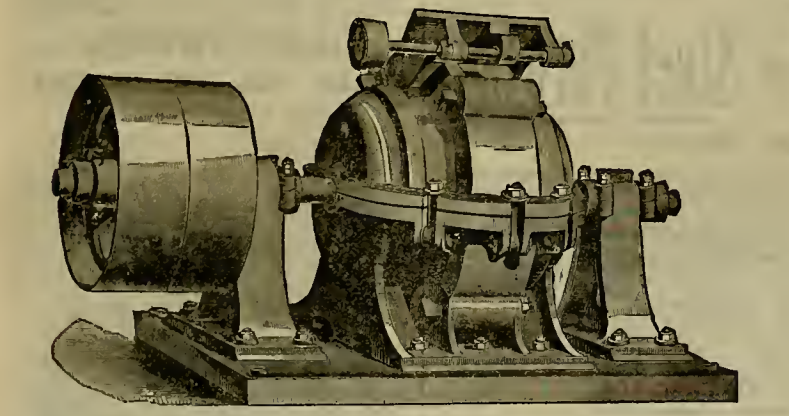
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At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.
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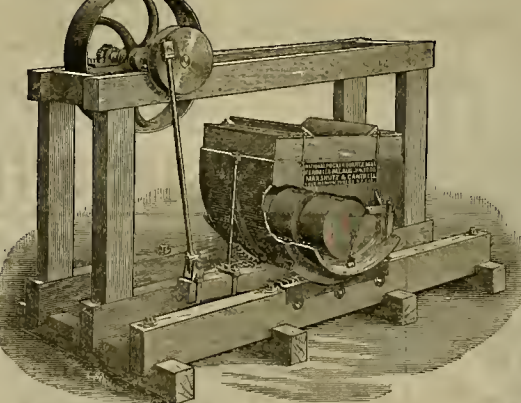
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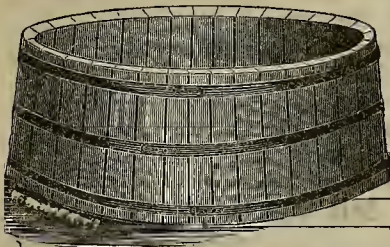
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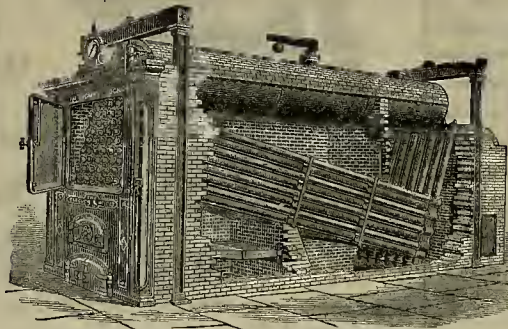
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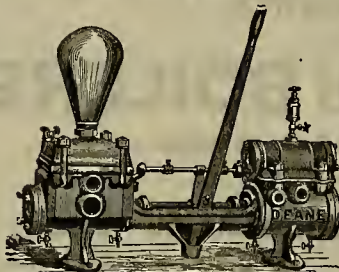
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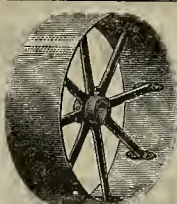
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COAL MINES OF THE WESTERN COAST.

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written by W. A. Goodyear, Mining and Civil Engineer,
formerly of the California State Geological Survey.

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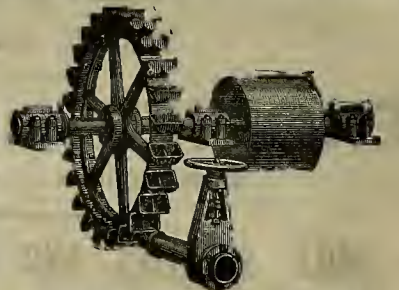
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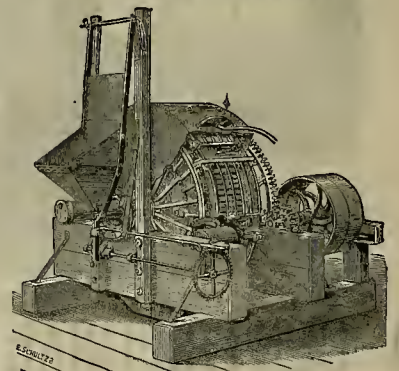
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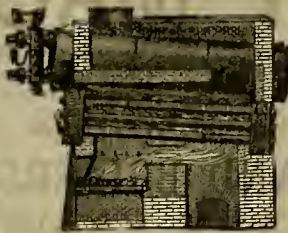
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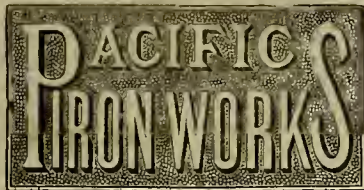
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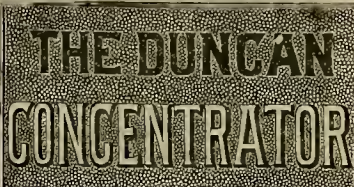


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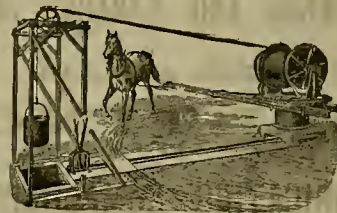
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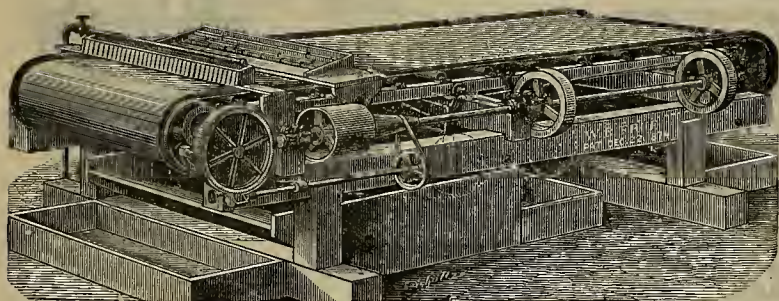
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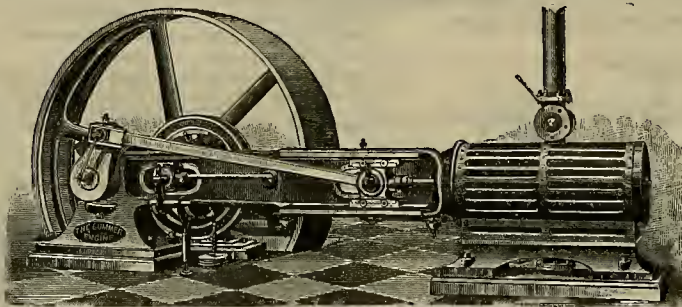
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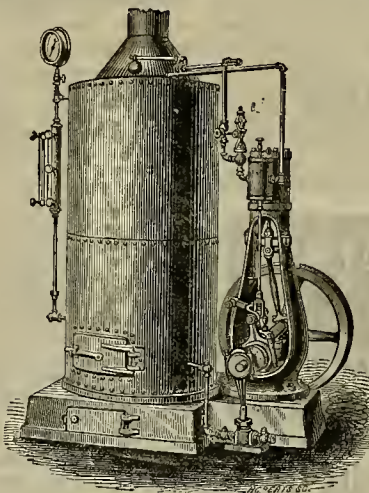
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, MARCH 12, 1887.

VOLUME LIV
Number 11.

Feeding Ores to Stamps.

Managers of mills, superintendents and mill-men admit that one of the most important and essential factors which contribute to the proper reduction and amalgamation of gold, silver and other ores, by the battery process, is their initial perfect pulverization under the stamps.

To accomplish this, automatic ore-feeders are now fitted in every well-appointed quartz mill. In the early days of California, the Golden State, when stamp mills were first introduced, the method of hand-feeding to the batteries was adopted; but it was learned that men oft-times drink, become lazy, sleep on their shift, were often inexperienced and always expensive, and the result of their labor was a costly wear of iron and an imperfect reduction of the ores.

Theory of Ore Feeding.

In order to reduce ore properly by the battery process, the theory of feeding must be understood. It is strange that intelligent mill-men should so often disagree upon this important point. The theory is simple, and a simple, practical illustration will prove it to be so.

Take an ordinary hand mortar and pestle, and attempt to pulverize a quantity of quartz; drop in but a small quantity, just sufficient to cover, in a thin layer, the bottom of the mortar, and it will rapidly pulverize under the blows of the pestle; drop in a large quantity, and the blows of the pestle will be ineffective, and time and labor lost in the effort to reduce it to powder.

In this lies all—the open secret of the theory—therefore let this rule be observed: To so adjust the rod leading to the lever bar of the ore-feeder, that the stroke of the tappet shall cause it to “feed low,” and then the desideratum of the “largest quantity of ore milled in the shortest period of time” will be attained.

Automatic Ore-Feeders.

The genius of Stanford and Cochrane supplanted this crude hand labor by the invention and introduction of “self” or automatic ore-feeders. The first device intended to supersede the expensive imperfections of the labor of feeding by hand was conceived by one C. P. Stanford, of San Francisco, and letters patent were granted to him about 25 years ago. This device consisted of a shaking table, having an “up-and-down” movement. In the original form of its construction, owing either to its crudity or opposition to its introduction, but few of them were manufactured and placed in practical use.

The Belt Carrier feeder, devised by Thomas A. Cochrane, was patented May 27, 1873, and, being constructed upon scientific principles, permitting of perfect automatic action, was successfully introduced into many of the quartz mills of this State, notably among which were the “App,” “Heslep,” “Patterson,” and others of Tuolumne county; the “St. Patrick” and “St. Lawrence,” of Placer county; the “Keystone,” “Lincoln,” and “Oneida,” of Amador county, and as well in other mining districts.

The next device was denominated the “Roller feeder,” but their rolling has certainly gathered but little moss.

The “Tulloch” was patented in 1873, but their sale has been limited, although they present some features which recommend their use.

Following these several inventions there came the “Challenge feeder,” which, in its improved form, we here illustrate, and letters patent for which were granted March 17, 1874, December

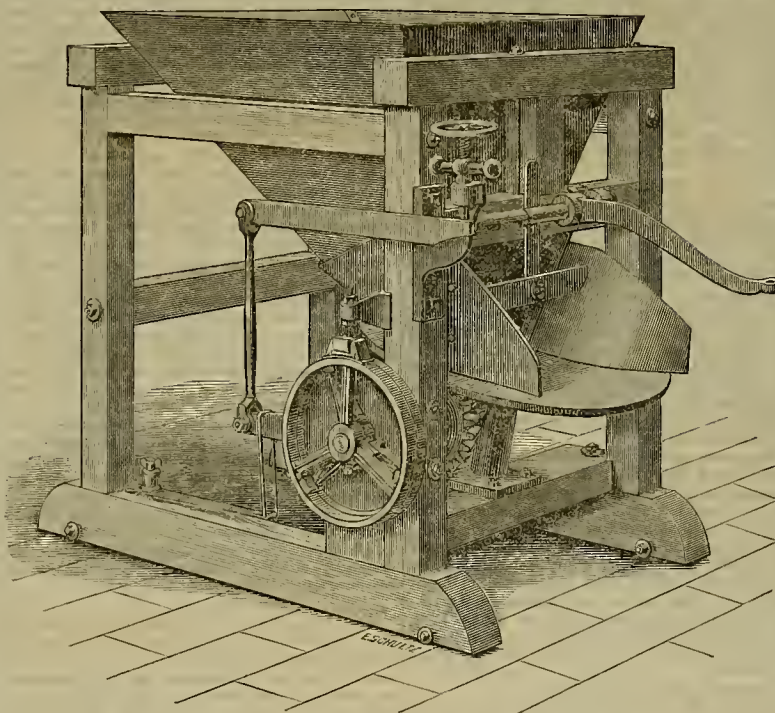
28, 1880, and July 21, 1885. It is pertinent to state that the use of the “Challenge feeders” has demonstrated the fact that 20 per cent more ore can be crushed with at least 15 per cent less wear of iron than by hand feeding.

From an examination of the recent improvements which have been introduced into the construction of these feeders, from the fact which has been brought to our knowledge that over 1600 have been placed in successful practical operation, we are assured that in their present form, as shown in the cut herewith accompanying, they are superior to other forms of feeder yet devised, and we take occasion to direct attention to an advertisement

perfection to which an automatic feeder can be and has been brought.

The changes which have been made in this feeder and now make it of an improved form are briefly as follows: The rock shaft in front, as shown in the accompanying cut, receives the blow of the tappet through the hump-rod, from the middle stamp of a five-stamp battery, and this obviates the necessity of constructing right and left-hand feeders as heretofore, and consequently the further necessity of ordering right and left-hand feeders or their parts, whenever same are required.

A further improvement will be found in the fact that the lever attached to the friction grip



“CHALLENGE” IMPROVED ORE FEEDER.

which appears in our journal of this date, in which the testimony of certain of the most reputable mining men of our State bears witness to the superiority of the “Challenge” feeders. It may be well to remind the superintendents of mining properties, or those who may contemplate becoming interested in quartz-mining enterprises, that they should note in their specifications when they may require milling machinery the superiority of the “Challenge” feeders. This leads us back to the initial point of this article, in which we state that “one of the most important and essential factors which contribute to the proper reduction and amalgamation of gold, silver and other ores, by the battery process, is their initial-perfect pulverization under the stamps, and to accomplish this, automatic ore-feeders are now fitted in every well-appointed quartz mill.” It is also proper to state that Mr. Joshua Hendy, manager of the Joshua Hendy Machine Works, Nos. 39 to 51 Fremont street, this city, has devoted many years of his life to the study of the true and practical principles upon which an ore-feeder should be constructed, and the illustration of the improved form of the “Challenge” feeder herewith presented shows the

is now placed outside of the frame, and the friction brake, as further shown in the cut, is now fitted on the top of the brake-wheel, and not underneath, as in the old form, and is, therefore, relieved from the grinding action of sand, etc. It is believed that this change of mechanism will permit of greater ease of adjustment in the operation of this improved form of feeders.

The Joshua Hendy Machine Works are also special manufacturers under letters patent, which they control, of the “Stanford Improved,” the “Tulloch,” as well as the “Original Roller” feeders, each of which has its special features of merit, but neither approaches the standard of superiority established by the practical operation of the “Challenge.”

SEVERAL trips since the steamer Granada carried to Mazatlan, Mexico, about 400 Chinese, who were to work in the mines about 100 miles north of that place. The mines did not prove the bonanza that the owners anticipated and the heathens were left in full charge of the mines without a sufficient supply of food.

THE Transvaal gold fields, Africa, are again attracting considerable attention.

Our Critics Abroad.

The New York newspaper press never tires of animadverting on what it is pleased to term the devious methods of the San Francisco mining share manipulator, about which methods there seems to be, in the estimation of these metropolitan journals, something especially reprehensible and crooked, one of them having only quite recently commented on the subject with much asperity. And this from a paper published in a city noted for the magnitude and vicious character of its stock operations, its swindling pools, wash-sales, bucket-shops, and like devices for entrapping the simple and unwary! “An ounce of civet, good apothecary”—nay, make it a pound—the subject is especially malodorous!

We have, to be sure, here in San Francisco, a couple of stock hoards, feeble concerns, whereat a few people amuse themselves buying and selling mining shares in a small way, as boys play pins! But how pitiful and innocuous these proceedings beside those carried on at the various stock hoards in the city of New York! As the shrimp compares with the whale, so do our stock transactions compare with those of this modern Gotham by the Atlantic seaboard! We have the untamed feline in our midst, it must be confessed; but ours is the comparatively harmless wild cat that merely growls and scratches—theirs the tiger of the jungle that kills and devours.

Then, be it observed, we confine our gambling to mining shares, employing only the implements and methods generally recognized as admissible in this sort of business. These New Yorkers gamble in everything and have recourse to modes the most slippery and indefensible. Nothing is too large and nothing too small to receive attention. They speculate in anything from United States bonds to shares in a hogus insurance company; from corners in flour, coal, pork, petroleum, kindling-wood, anything that the masses cannot well do without. The instrumentalities made use of are to them of no consequence. Wrecked railroad shares, a pack of cards, a dice-box—whatever comes to hand—is made to serve, so it enables them to compass illegitimate gains by illegitimate means. The San Francisco mining sharp, after graduating here, goes to New York to finish his education. It is the case, indeed, that such of the fraternity as find the moral atmosphere on this coast too pure for comfort, are apt to seek on the other side of the continent a habitat more congenial to their tastes and more favorable to their aspirations.

To such extent has the popular idea in many of these Eastern towns become familiarized with the language of the Bourse, that the clergy there are said to largely employ this nomenclature in their public ministrations, exhorting their hearers to keep good their spiritual “margins,” talking of theological “puts” and “calls” and “straddles,” and so on to the end of the stock sharps’ vernacular. The ways of the San Francisco broker are looked upon as guileless and provincial by these nabobs of the Eastern Bourse, who have glorified the Plutocracy by giving to it a new language and a new literature, and made mammon more than respectable by winning to it the countenance of the influential, and throwing over it the glamour of their ill-gotten wealth. We wager the scribe who pens these screeds for New York papers an old hat that he writes ignorantly!

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

South Fork Mining District, Shasta County.

EDITORS PRESS:—This district is situated about 12 miles southwesterly from the town of Redding, on the head-waters of the south fork of Clear creek, and is attracting no inconsiderable amount of attention at present, owing to important developments that have been made in the last few months in opening some of the many promising silver mines of the district. A brief notice of some of the more prominent mines, and a rough sketch of some of the surroundings and advantages of this interesting mining region, may not be uninteresting to the many readers of the Press at this time. This is one of the oldest districts in this part of the State, and has attracted little attention of late years, owing chiefly to the facts that its rich placers are practically exhausted, and its ores of gold and silver, being known to be base or refractory, it was long thought to be impracticable to profitably extract riches they were known to contain; in fact, many efforts were made to that end a few years ago, but nearly all failed, owing to imperfect appliances and lack of skill in treating the ores. Now, however, it is found these ores can be worked without difficulty and made to yield up their treasures at small cost.

Two miles to the northwest of the village of Igo, we find a large contact vein at the junction of the slate and granite. Several claims located on this lode show fine prospects for the work done. One mile further up the creek is situated the Grand Central claim, owned by P. Gibney and several other San Franciscans. This is a gold-bearing sulphuret vein, showing a width of over 20 feet where it is cut by their tunnel. Assays average \$20 per ton. Continuing up the creek, we next come to the Chicago mine, which had been worked spasmodically for a number of years, and has yielded a large amount of high-grade ore, which was mostly shipped to San Francisco and Denver, Col. This property, although badly "butchered," has lately passed into the hands of some practical mining men, late of Colorado, and who are at work to thoroughly explore and open it up. They have opened a new level and already have a fine body of ore in sight. There is a five-stamp mill equipped with two concentrators, a pan and settler, and also a 10-ton reverberatory furnace on the premises.

Just Over the Ridge

To the southwest and adjoining the Chicago, are the South Chicago and Red Warrior mines, opened by a number of tunnels and shafts, showing fine bodies of galena and sulphuret ores of high grade. Recent assays at the Continental Mine Assay office of Red Warrior ores yielded over \$100 per ton, the vein being six feet in thickness. These mines are owned by the Shirland Brothers. The surface ores of this district are what are known as ochreous, and are worked by the arrastra process for the free gold they contain. These ores are usually found cropping out at the surface and go down 15 to 50 feet, and sometimes to greater depth until water level is reached, and then galena and sulphurets take their place. In many instances these ochreous ore hear a large percentage of silver chlorides; usually, however, the silver has all leached out, leaving only the gold. The next mines up the South Fork a mile or so, is the Pacific group owned by the Shirlands and Hubbard. They have worked these mines for several years past for the free gold contained in the surface ore, which have yielded them an average of about \$20 per ton in the arrastra. They have a fine showing in all their workings of galena and sulphuret ores, many of them assaying way up in the hundreds of dollars per ton. Continuing up the stream half a mile, we come to E. L. Ballou's group of mines, consisting in part of the Great Falls, Hope and Manzanita. Mr. Ballou has been working the ochre of these mines for eight years and has made it pay very handsomely; he also has a large amount of base ores in eight all through the workings of his property.

The Chico Group.

Adjoining the Ballou mines on the northwest, and parallel with them, lie the Chico group, consisting of the Chico, Dayton, Smith, Florence and Chico North. The Chico was opened last summer by several open cuts, a tunnel and shaft producing several tons of high-grade ore. The Dayton has been opened along the vein for a distance of over 200 feet, showing a ledge from two to six feet at 40 feet from the surface, assaying from \$40 to \$200 per ton. The Smith mine, which is an extension of the Dayton on the north, has been worked for many years near the surface for its rich ochreous ores, which at the water level turn to sulphuret and galena.

The Continental Property.

To the northwest some 900 feet, and parallel to the Chico group, is situated the Continental Consolidated. This property was first located in 1868, and has been worked from time to time until 1881, when all work ceased except the yearly assessment. The parties then owning it expended a large sum of money in the construction of a five-stamp mill, a reverberatory furnace of ten tons capacity, and a number of large leaching tanks. They ran one long tunnel to crosscut their ledge, but unfortunately

ran it in the wrong direction. One hundred feet higher up the mountain, however, they sunk a shaft 36 feet and ran a drift from the bottom some 25 feet, and took out 100 tons of ore that assayed above \$50 per ton and attempted to work it in their mill, and by roasting and lixiviation. They made a complete failure, owing to the want of knowledge of any of the owners or employees in the treating of the ores. Their failure resulted in the closing down of the works, which remained in that condition until July last, when the Continental passed into the hands of Litten Bennett & Co., who became satisfied after a short investigation that only systematic development was required to make the Continental a valuable property. Fifty-five dollars being the average assay of the ore extracted by the former operators was considered a pretty good starter by L. B. & Co. The old shaft was cleared of water and debris and sunk to 50 feet. A drift was started from the bottom and ore at once taken out that assayed from \$60 to \$250 per ton, and as the drift was pushed ahead, the vein opened out so rapidly that it was too large to be all taken in the size of a working drift. The ore becoming more heavily charged with sulphurets and galena as the work progressed, occasional patches of rich silver were also encountered. This drift was continued 50 feet, when it was deemed advisable to crosscut with the view to ascertain the full width and strength of the vein at that point; this crosscut is now in 13 feet, showing a full face of high-grade ore. For the purpose of a proper understanding, we state here that the shaft is sunk on the base of a ridge, which rises abruptly toward the east, and the drift at the bottom of the shaft was pushed to the east also, following the hanging-wall, the end and face of the drift being now more than 100 feet perpendicularly from the surface. The outcrop of the vein on the surface shows a width of over 40 feet, and six large veins enter or connect with the main lode at intervals within a distance of a thousand feet, all showing mineral in paying quantities. Several years ago a tunnel was driven from the mouth of the shaft into the mountain, following the foot-wall for a distance of 110 feet. This tunnel shows a heavy body of high-grade ore all the way in. For 364 feet southwesterly from the shaft, and 100 below that level on the mountain side, the ledge has been exposed by an open cut, and shows a width of ten feet of quartz, which assays above \$25 per ton at the grass-roots. The ledge at this point has a two-foot gouge next the foot-wall.

Many Thousands of Tons of Ore

Are now uncovered on this property. Repeated tests, both by assay and milling, show an average value of all the ore to be above \$60 per ton. The Continental is without doubt an immense and valuable mine. Arrangements are being made to put in a plant with capacity to handle 20 tons per day of these ores. There is on the dump now over 400 tons, and from three to five tons per day is being extracted by the labor of three men. The ore is easily worked by roasting and milling processes. It carries from three to five per cent in lead, has a large percentage of zinc blende, a small quantity of copper and antimony.

There are many other promising mines in the district that only need development to make big properties of them. The natural facilities for the cheap extraction and reduction of the ores are all that could be desired, i. e., abundance of fine timber, splendid water-power, and good roads making them easily accessible from the railroad. Mines with abundance of high-grade ore are to be had at reasonable figures, and all that is required to make South Fork one of the leading camps of the coast is capital properly directed to develop its abundant treasures.

LIVE OAK.

Shasta Co., Cal., Feb. 24, 1887.

A MINING MILLIONAIRE.—A miner in Leadville, Colorado, who can neither read nor write, is worth to-day at least \$3,000,000. Four years ago he hadn't a penny, except what he earned from day to day as a miner. His name is John L. Morrissey. He is a young man, not over 32 or 33. The Crown Point mine, like Tom Bowen's Golconda, was just about paying expenses. Her owners offered to sell her for \$40,000. Morrissey went to Chicago and interested Diamond Joe Reynolds in the matter. Reynolds knew that Morrissey was an authority on mines, even if he couldn't write his name. He finally purchased the Crown Point, agreeing to give Morrissey a half interest after the original sum was repaid. Within 30 days they struck a vein of high-class ore that has yielded them a monthly income of \$18,000 apiece ever since. There is said to be \$5,000,000 worth of ore in sight. Morrissey cannot even tell the time of day. It is a stock joke among the boys if you ask him what o'clock it is, for him to pull from his fob a \$500 watch, and with a condescending air tell you to "luk for yourself, an' then ye'll know I'm not lyin' to yez."

BORAX.—Said the owner of large borax fields in Esmeralda county to a *Gazette* reporter yesterday: "The prices paid at present for borax are hardly calculated to create an immediate rush for such properties. They are very low, and have been for years. Yet I do not apprehend lower prices. I rather look for a gradual appreciation, owing to a perceptible increasing demand for the article. New and practical uses for it are discovered every now and then. The latest is to pack fresh meat, fresh fish, etc.,

with it instead of salt. A large shipper of fresh beef in Chicago recently told me that he finds it much superior to salt for preservation purposes, and it can be readily cleaned from the meat and leave behind no taste of it that is noticeable. He predicts that hundreds of tons of borax will shortly be used for this purpose alone every year."—*Reno Gazette*.

Unprospected Country in Montana.

There is a strip of country extending from the head of the Boulder range in a southeasterly direction to the Bitter Root valley, that is not only pronouncedly mineral but is, in a large measure, unprospected. What has operated as a serious bar to geographical exploration is the rugged and mountainous nature of the section throughout its entire length. In this belt occurs the great silver and gold deposits of Phillipsburg, Cable, Granite and Georgetown. Large deposits of iron ore, veins of copper, silver and gold have been located between Phillipsburg and Cable. The mines of Silver Lake and Mineral Hill, south of Cable, have produced in varying quantities for years a portion of the bullion output accredited to the Flint Creek district. South of Silver Lake the country is a veritable "Terra incognita." The heavily timbered Cable range has given place to a wilderness of snow-capped peaks whose solitudes are never broken save by the footsteps of some wandering hand of ibex. The canyons are masses of gloom, shadow and fallen timber. The mountain-sides are covered with slide-rock, and wherever the adventurous prospector turns he encounters natural difficulties that soon dishearten him from further research. All who have penetrated this section any distance confirm the report that quartz carrying more or less mineral is easily found. Would it not be well, then, for many who spend each year in looking up mines in sections like the Flint Creek that are easily prospected, to turn their attention to those portions of the country which have been avoided in the past for the reason above noted? To find a good mine is to make a fortune quick, and no finer field is offered the searcher after precious minerals than this one of the many unexplored sections of Deer Lodge county. We trust to chronicle in the spring many new discoveries in the Cable range.—*Phillipsburg Mail*.

RAILROAD FUEL.—The engines on this division—Sacramento to Truckee—now use coal almost exclusively, and by so doing, much valuable time—an hour and a half to two hours—is saved on an average in making the run between those places. This is the principal advantage derived by the company from the change, though the cost, we believe, is a trifle less than that of the wood. Another advantage is found in the consideration that the wood is becoming scarcer from year to year. Much of that lately or last cut for the company's use is small and sappy, being from young timber, and it was not therefore as well adapted for the purpose of steam producing as that of older growth. In the course of a conversation the other day with Mr. S. B. Talbot, fuel agent for the railroad company, we learned that during the coming season the company would need no wood whatever this side of the Summit, except such as had already been contracted for—that is to say, about 2000 cords to be furnished by J. B. Chinn, of Emigrant Gap, and about 6000 cords by the Yuba Valley Wood Company, of Dutch Flat.—*Placer Argus*.

THE UTAH SALT SUPPLY.—Our salt supply during the coming spring months is going to be considerable of a difficulty, if all reports are true. The roads bordering the lake are now in horrible condition and gradually getting worse, and the matter of getting salt to the cars is already a grave difficulty. The warm weather in the Great Salt Lake valley, together with the snow that has fallen, has rendered the roads almost impassable; hence the transfer of salt from the settling vats to the cars is a slow and tedious operation. We are informed that the Ontario laid in a supply last fall in anticipation of this same trouble, but as the evil is starting in so much earlier and will in all probability continue just as long, this supply is liable to get pinched very close before traffic is fully restored. We trust some means will be found to overcome the trouble before it resolves itself into a serious matter and threatens the mining interests of Utah.—*Park City Call*.

THE RENO REDUCTION WORKS.—Everything at the new reduction works is running smoothly. The company has on hand over 400 tons of ore, and the quantity coming in daily is more than enough to meet the working requirements of the plant. It is proposed to start up the new smelter tomorrow. The marble that was brought in some two weeks ago from the Inyo quarries for flux has been found to answer the purpose admirably. The company proposes to add to the plant this spring a refinery, and at least 10 or 20 stamps for the working of free ores. Two bars of bullion, valued at \$1909, were shipped on last evening's express train.—*Reno Gazette*.

THE CHICO CHRONICLE (Butte county) learns that a landslide in the mountains near the Sutter house, disclosed a lead of quartz showing free gold in abundance. It was, of course, located at once.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CAR COUPLING.—Wm. S. Doan, Sacramento, assignor of one-half to Wallace Doan. No. 358,190. Dated Feb. 22, 1887. The invention consists in the novel mechanism for guiding the link to its position in the opposing draw-head, and for controlling the insertion and removal of the coupling-pin. The object is to provide a practicable means for coupling and uncoupling cars, without having to go between them.

TUBULAR LANTERN.—Emile Boesch, S. F. No. 358,186. Dated Feb. 22, 1887. This invention relates to that class of lanterns in which the necessary draught or current of air for combustion is furnished through a series of tubes opening out above, and communicating below, with an air space under the oil font. The object of this invention is to provide a complete, effective, and generally superior lantern of this class.

GRAPE STEMMER.—Wm. H. Worth, Petaluma. No. 358,241. Dated Feb. 22, 1887. This improved device is especially adapted for stripping grapes from their stems and discharging the grapes at the instant of separation and without crushing. It consists of a horizontal revolving drum, having spirally arranged flanges projecting from its periphery, and an outer inclosing case of the same shape, having similar spiral flanges fixed within it, but at the reverse angle from those on the drum, the flanges in both cases occupying upward of two-thirds of the circumference of the drum and case, and, in connection with these, of a longitudinal flange projecting from the side of the drum, extending its whole length in the space not occupied by the flanges. In connection with the stemming device, which has a discharge opening at one end for the stems, a hopper or chute is employed to receive the separated grapes, and crushing rollers are operated in connection therewith.

ORE FURNACE.—Terry McGinnis, Anaconda, M. T. This invention relates to that class of furnaces which are used for treating mineral-bearing ores of all kinds, and it consists in heat and flame-directing plates or dampers, which are preferably vertically adjustable, and are let through the top or arch of the furnace so as to extend within the ore chamber of said furnace; in a partition or dividing wall separating the grates of the fire-box, and a means of securing it in place; in novel adjustable bearings for the spades or blades which are used in stirring the ore upon the hearth, whereby said spades or blades may be readily handled; in the peculiarly located draft apertures, and in various details of construction. The present style of stirring the ore on the hearth necessitates severe labor; but with the swinging plates or frames provided by this invention, this difficulty is overcome. The object of the divisional wall for the grates in the fire-box is to distribute the flame over the whole surface of the first floor or divisional hearth. The plates or dampers continue this distribution all the way through the hearth. The manner in which the divisional wall is secured prevents it from being worked down by throwing wood against it. Lower apertures supply air to the grates in the center and keep them cool. The upper ones, which go through the front arch, draw the flame into the ore chamber effectively.

DAMMING BACK WATER.—Mr. L. Tietjens, of Stassfurt, Germany, has recently patented a very ingenious method of damming back the flow of water in shafts by the application of the well-known fact that certain salts increase their volume very materially by the absorbing of water of crystallization in hardening. To accomplish this, he takes either calcined soda, anhydrous alum, kieserite, or oxychloride of magnesium, mixes them into a paste, and then immediately injects them through a suitably arranged pipe into the fissures through which the water flows. As this paste hardens, it swells enough to fill all the interstices of the rock and to render it thoroughly water-tight.

THE PELTON WHEEL.—The demand for the patent water-wheel invented by L. A. Pelton, of this city, continues to steadily increase as its superior merits become more widely known and thoroughly understood. The Nevada Foundry, at the corner of Spring and Wyoming streets, is busily engaged in filling orders. Quite a number of first-class mechanics are almost constantly engaged in this department, and the prospects are that the force will have to be increased soon, in order to meet the growing demand. So far this year, eight of the wheels have been sold. The last one to leave the foundry is for a Chicago firm.—*Nevada Trans.*

NEW PACIFIC OCEAN STEAMSHIP LINE.—The Canadian Pacific Railway, to which recently was chartered the Cunard steamships Parthia, Batavia and Ahyesia for its Pacific trade, has arranged to start its first line from Vancouver to Japan and China ports. The Parthia will be the pioneer steamer of the line, leaving Hongkong by way of Higo and Yokohama for Vancouver. Vessels will run monthly until new steamships are built. The line will connect with the Peninsular & Oriental and Messageries Maritimes Lines in the East India trade.

Mineral Resources of Santa Cruz County.

"Talking about the golden boulder, an account of which was published recently," said a Santa Cruz pioneer last Saturday in conversation with a reporter of the *Santa Cruz Sentinel*, "this amount, \$50,000, mentioned as being taken therefrom is entirely too high. There was about \$15,000 taken out; that's all. The article states that it was taken from a boulder, but this is a mistake, as the gold came from the under side of a vein which was discovered by a man named Hinds. With him prospecting was George Inskeep and one or two others. I saw this vein shortly after its discovery. It was about five miles from Santa Cruz, on a branch of Gold gulch. They were prospecting at the time in a little gulch that led up to the vein, and naturally came across the bonanza. The vein was on Davis & Cowell's ranch. There was much money expended in searching for gold in that gulch, but more was expended than taken out. The vein was cut at a depth of about 200 feet with a tunnel, but was exhausted, and no more gold in paying quantities was found."

"Do you remember when gold was first discovered in this county?" the reporter asked.

"I think that gold was discovered on Ben Lomond, near the old Williams Landing, in 1850. This was about the earliest discovery of which I have any recollection. Gold is scattered all over this county, but not in paying quantities. Gold has been found in little streaks in the same kind of rock as that from which the bonanza was taken, but, as I said, it was only in small quantities which never paid. When granite and metamorphic limestone showed itself, gold could be distinctly seen in small streaks. The Santa Cruz gold is worth from \$13 to \$15 an ounce in San Francisco, as it contains some silver. The same formation that carries gold in this county is also noticed in Monterey county. There has been much prospecting in Santa Cruz county, but no great discovery has resulted, as there is no coal formation in this county. The limestone does not carry any metal in it except a trace of silver and plumbago. The limestone has been declared to be fine building stone, as it takes a good polish and is very durable. The granite is of but little value, as it contains too many mineral substances that decay too rapidly. There is mineral oil (petroleum) in this county, as traces of it have been found in the mountains and other parts of the county. Much search has been made for petroleum, but it has not been found in quantities that paid for the working of it. I think that if any great discovery of petroleum in this county is ever made it will be near the beach. The asphaltum used for street purposes is a tarry residuum of a cut-petroleum bed, as the petroleum shows itself on each side of the ridges, having been cut through by the ravine. The amount of asphaltum in this county is unknown, as there are immense quantities of it. Davis & Cowell, A. Walrath, of Nevada county, and I. L. Thurber own the lands on which are the asphaltum beds. That on Davis & Cowell's is not known, as it has never been prospected. The asphaltum has been worked on Thurber's and Walrath's lands. There is an abundance of garnets in the granite portion of the county."

"Is there much gold in the black sand along the beaches?"

"Yes, the black sand contains gold; but it is difficult to save, and is of more value to work for the iron, of which it makes the best class, and is now being used for that purpose in New Jersey. In the gold, iridium is mixed in, and is difficult to separate. It is not generally known that diamond-point gold pens are pointed with iridium. The grains found in the black sand of this county are not large enough to be useful. It is a very valuable metal."

A Big Tunnel Project.

The probability of the abandonment of the mineral portion of the Reservation has revived the idea of running a tunnel through Mount Grant. Some years ago a party of capitalists began to make calculations as to cost, etc., but learning that they would have continual annoyance from the Indians, and that they would always be in fear of an order of removal, they abandoned the project. Now that there is likely to be a chance for unobstructed work, the same men have resumed the project, and are contemplating beginning work as soon as the Reservation line is withdrawn. The eastern side of Mount Grant is very steep, rising from the lake a little over 7000 feet in a distance of three-quarters of a mile. The mountain is traversed in all directions by mineral-bearing ledges, some of these very large, and much rich gold-bearing float-rock has been found. The tunnel will make depth faster than distance, and will, in all probability, cut some of the ledges from which the above-mentioned float-rock came. Whatever ledges may be found will be cut so deep as to be below the breaks and faults which have annoyed and hindered prospectors. The story of the Lost Mexican mine is known to nearly everybody in this section, and every year one or more parties organize for a search for the wonderfully rich ledge. Frequent discoveries of remarkably rich rock keep up the interest in this almost legendary mine, and as the size of some boulders which have been discovered indicates

an extensive formation, the lucky locator will undoubtedly be one of the richest men in the world. Old Henry Garner has for years worked near the headwaters of Rose creek searching for a big ledge, the float from which he has traced to that vicinity, and which he thinks may be a portion of the Lost Mexican. He has at times found immense quartz boulders containing gold, and has implicit confidence that he is near the ledge. This ledge and many others will, without doubt, be cut by the tunnel, and 7000 feet of vertical distance can be worked without the outlay of hoisting. The expense of running the tunnel will be great, of course, but not nearly so great as in many places where tunnels have been driven with less chance of profit and much less possibilities as to the measures of success.—*Walker Lake Bulletin*.

RAILROAD EXTENSIONS.—No time will be lost by the owners of the Donahue line in pushing forward the two large railroad enterprises projected by them during last season. In conversation with a reporter, Colonel J. M. Donahue stated that the plans, specifications, etc., of the extension from Cloverdale to Ukiah were now completed and work on the proposed route would be begun as soon as the right of way is secured. "The road," continued Colonel Donahue, "is going to prove very expensive to build, as there will be at least 4800 feet of tunneling to pierce. By means of these tunnels, however, we have secured a one per cent grade, which will enable us to operate the road almost as cheaply as that between Petaluma and Cloverdale. An exceedingly practicable route has been discovered for this road, and there will be no great curves or bends, and when the road is completed it will be almost in a direct line between Ukiah and Cloverdale." In reference to the other road, Col. Donahue stated that the surveys and plans for the road to connect the Donahue system with that of the Southern Pacific were completed. The projected route started from a point on the main line between Pacheco and Novara, running across the marshes to the Sonoma valley narrow-gauge, and utilizing its tracks for some distance, thence on to the Napa junction. Work on this route will be commenced within the next 30 days, and the road will be constructed with as much speed as possible. Colonel Donahue also stated that he had lately ordered eight very handsome passenger coaches for use during the coming season.

HOW INDIANS CAMP IN THE SNOW.—The *Virginia (Nev.) Chronicle* relates that during the recent storm, a denizen of Six-mile Canyon observed two Piute hucks preparing to bivouac in the snow. They had but one blanket between them, with which they enveloped their persons, carefully covering their heads and feet. They then lay down in a hole hurrowed in the snow, and by twisting their persons about, succeeded in hurrying their bodies to the depth of a foot or more. The next morning the man who had observed the Indians preparing their bivouac, saw nothing to mark the spot where they lay down the evening before except an elevation resembling a grave. Thinking the hucks had perished with cold during the night, he sallied forth, armed with a shovel, for the purpose of exhuming their remains. The first thrust of the shovel caused a sudden movement of the mass resembling a snowy grave, accompanied with an "Ugh!" followed by the Piutes rising to their feet and shaking the snow from their single blanket. Their bodies were steaming with perspiration in place of being frozen stiff, as the philanthropic resurrectionist expected to find them.

MINERS' PERMANENT ICEHOUSES.—The miners in the dry districts are having a busy season. They never before had such an opportunity for laying in a water supply, and barrels are in demand. Some of the boys are storing snow in great quantities by packing it in old tunnels. These old tunnels with their crosscuts form excellent and substantial icehouses and next summer the enterprising individuals who have made ice while the snow lasted will be in comfortable circumstances. The snow is wheeled into a tunnel and solidly packed so that during the night it becomes almost ice; this operation is repeated daily, and two men can, in a few days, put up enough to furnish an abundant supply for a year. Next summer, visitors to the dry districts will be surprised and delighted when they receive a drink of ice-water instead of the expected lukewarm liquid.—*Walker Lake Bulletin*.

NYE COUNTY MINES.—The mines of Nye county, Nevada, during the year 1885 produced 233 tons 910 pounds of ore, valued at \$22,001.26. In 1886 they produced 7450 tons 1845 pounds of ore, valued at \$225,264.50. It is predicted that the value of the ore output for the year 1887 will more than double that of 1886. In fact, it is safe to say Nye county will soon rank with the big bullion-producers of the State. Recent developments in Ophir, Tyho, Reveille, Spanish Belt, San Antonio, Morey and Union mining districts are very encouraging.—*Belmont Courier*.

ONE EFFECT OF MELINITE.—General Brailmont, who has been experimenting in Belgium with the explosive melinite, has advised the Roumanian Government to suspend labor on the defensive works around Bucharest, as it will be necessary to devise new plans to withstand the new explosive.

Hermosa.

A Camp Coming to the Front.

Very little has been said in the newspapers of New Mexico about the camp of Hermosa, lying as it does (as the crow flies) 15 miles north of the flourishing town of Kingston, in Sierra county (formerly Socorro county) and 25 miles by the winding trail through the mountains. A correspondent of the *Socorro Bulletin* says: Hermosa has a future equal at least to Kingston. It is on the same mineral belt, and has been a producer of the precious metals for several years. The camp has been self-sustaining, without any particular effort having been put forth by the few miners working to induce capital to take hold, and as so much development work is necessary to put mines (generally) on a paying basis, we claim for Hermosa at least more than the average, because through the physical exertions of a few men without means the camp has been a steady producer and has the name of shipping to the Socorro smelter the highest grade ore received from any one section in New Mexico.

To go into detail about each good prospect or paying mine of Hermosa, or Palomas district, as it is called, would take up too much space; hence I will only mention a few of the most promising properties, leaving to future development a place in your paper as they come to the front. The mine having the largest amount of development and a steady producer is the Palomas Chief, with nearly 2000 feet of shafts, levels, etc. The Chief is owned by Lewis, Doran & White, the latter being its present manager. The Chief has been, and is to-day, a mine in the full sense of the word. The deeper it is worked the richer and plentier is the ore. On the same belt is the Eagle, Pelican and Albatross, a group of mines that has produced thousands in the precious metals. This group is now under bond to a St. Louis company and will likely change hands. Two miles south is the Big Tree mine, owned by J. C. McCoy (on the same contact), one of the most likely properties in the district and a producer. It has shipped ore worth from \$200 to \$1000 to the ton. Further south from the Big Tree, on the same contact, is Grover Cleveland mine, owned by Judge Brinker, Attorney-General Smith and others. This mine is being worked right along with promising results. The Antelope has shipped over \$25,000 worth of ore, and the Ocean Wave and Longfellow have added their annual portion to the output, as well as the Humming Bird. Numerous other mines have made shipments of ore, and the dumps are full of rock worth from 30 to 50 ounces awaiting the operation of the mill at Chloride, which is the Russell lixiviation process of treating ores.

Twenty miles north of Hermosa is the town of Chloride. Here are being erected the lixiviation works to test the ores of the range. C. J. Goff, brother of the Hon. Goff of West Virginia, is manager. They expect to have the process in operation some time in March. Among the best mines are the Silver Monument, St. Cloud, Nana, Wall Street, King No. 1 and 2, and a host of others.

Visitors to the Lick Observatory.

In a recent interview, Prof. Holden, of the Lick Observatory, said: "To do justice to the large telescope and to its situation, we must have a large staff of astronomers and the leisure to work in. The recent addition to the University income was made with the distinct understanding that something over \$10,000 per year should be devoted to the support of the observatory. The income from Mr. Lick's gift will be about \$9000, and so the total income will be about \$21,000. The chief part of this I hope will be spent in paying the salaries of the very best observers who can be obtained. I have already promised to nominate to the Regents Mr. Burnham, of Chicago, Prof. Comstock, of Columbus, Ohio, and Mr. Keeler, formerly an assistant to Prof. Langley, at Allegheny, as astronomers. I hope also to nominate two other observers (whose names I withhold) and a secretary. These gentlemen and myself will do the observing, and we shall need a machinist and two janitors to help us. The President of the Lick Trustees, Captain Floyd, hopes to turn over the observatory to the Regents in July next, and he is making every effort to do this. He is even spending the winter on the mountain in order to hasten the work."

"One thing I mentioned just now as an indispensable prerequisite to our work was the leisure to work in. I mean that while we are at work we must not be interrupted in any way by visitors or by anybody. You can easily see that no work of any value can be done unless it is continuous and consecutive. I mean to devote two nights per month of each of the summer months to the recognition of visitors at night. We shall have all our observers there at the three telescopes (6-inch, 12-inch and 36-inch) to show visitors three interesting objects (one with each telescope), and to give such explanations as may be asked for. We will give the whole of our time for these two nights per month to this, and in return we expect the public to see to it that we have the other nights of the month entirely free for the legitimate use of an observatory. If we do not

have this free use of our time, the observatory will, no doubt, be a disappointment to its friends everywhere, and it will be a failure, and deserve to be. But I feel sure that the very intelligent public of California is going to see to it that its astronomers have every possible facility for doing their legitimate work."

Tombstone Ores.

A Lack of Lead Ores in Southern Arizona.

The ore of this camp, says the *Tombstone Democrat*, has been mined only above water level, and at first the silver was almost entirely in the form of a chlorido, or, as it is commonly called, "horn silver," inclosed in a gangue of quartz, containing also lead carbonate, manganese and iron oxides, the Vizona being, perhaps, the freest of all the ores produced here, while the Girard was decidedly the basest. The gold and silver tellurides existed quite abundantly at one time in the Girard, occupying a position between the zone of extreme oxidation and the water level. The general opinion is prevalent among mining men that the silver will ultimately change to a sulphide as depth is reached, and in time our mills will be replaced by smelters. Then comes the great question of lead. It might be said the ruling problem of to-day is: "Where are there sufficient quantities of lead in Southern Arizona to supply our need?" If it is the problem of to-day, imagine the enormity of the same problem in the near future. Prospectors, mind you keep this; keep your eyes open for lead; the carbonate is preferred, but galena will do. As sure as you live, it will be worth as much as a gold mine to you.

An insufficient quantity of lead compels the Charleston smelter to run on a very low lead charge, often as low as five or six per cent. An insufficiency of lead compelled the Woranoco smelter to shut down altogether.

In this camp we have no mines that are strictly lead-producers. The Ingersoll mine, from the lower levels, produced some lead, but as an offset, it also carried a quantity of zinc. There are a few mines of the Bunker Hill and Luck Sure type that carry enough manganese and iron to take care of its own silica, leaving the small percentage of lead free. Such ores are desirable. Mr. White is credited with saying that "the Contention will pay more dividends from the ore taken from below water level than it has from the ore taken out from above." If so, and if the ore changes to a sulphide, does not this mean a smelting proposition? and does not this call for more lead? Yee, and for more lead than we are able to supply. We therefore call the attention of every prospector in Southern Arizona to this point: that the lead is what we want, and it is worth your while to look for it.

HEATING RAILROAD CARS.—The New York Board of Railroad Commissioners, in response to a joint resolution of the State Legislature, has reported upon the question of safety from fire in railroad accidents. It finds that heating by steam from locomotives is not feasible in general railroad service. Its recommendations are contained in a bill which prohibits the use of stoves in passenger cars, inside or out, unless so constructed and guarded as to prevent the car from taking fire under any circumstances; prohibits the use of oils in lamps of less than 300 degrees fire test; prescribes floorings on bridges and cat-heads strong enough to support derailed cars, with guard rails on them and their approaches, to guide derailed cars back upon the rails, and pressable guard posts at approaches to bridges to catch a blow from any derailed car instead of the superstructure of the bridge itself. A minority recommends the heating of cars by steam from the locomotive and objects to kerosene for lighting. Bills to those ends have been presented.

THE LEADVILLE CARBONATE BEDS.—Colonel J. M. Grant and George C. Smith, prominent mine-owners of Colorado, are at the Palace, in this city. "Leadville," said Colonel Grant enthusiastically to a reporter, "never was better than now. You don't hear anything about it here, but it is going right along. About '83, people thought the bottom had fallen out, real estate went away down, and a good many moved away. But the owners of the old mines went deeper and reached thicker and richer contacts of carbonates than they had ever had before. Leadville now produces more ore than during the wild times of '79. Real estate has gone up 50 per cent in the last year, and a number of fine brick blocks have been built, among them the Tabor Grand hotel, costing \$500,000."

PRICE OF NAILS.—The Western Iron Association met at Pittsburgh, Pa., last week, and unanimously decided to reaffirm the card rate. The meeting was the largest that has been had for years, all mills west of the Allegheny mountains being represented, and it was considered certain that prices would be advanced; but after a thorough discussion manufacturers deemed it best to make no change for the present. Trade was reported unusually good for this season of the year, and a prosperous year, undisturbed by any wage trouble, is looked for. The failure to advance prices was a disappointment to workmen, as an increase in the card rate meant higher wages for all skilled employes.



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Passing Events.

The defeat of the Walrath debris-impounding bill, in the Legislature, is a severe disappointment to the hydraulic miners, who were in hopes they would, under its provisions, be able to work their mines without injury to any one else, and with profit to themselves.

The engineers, not only on this coast, but elsewhere, will have little to do for some time on river and harbor improvement work, the bill making the appropriations not having been signed by the President. Several works of magnitude on this coast, such as Oakland harbor and Wilmington harbor, will suffer temporarily.

The plans for rebuilding several horse-car lines in this city, and making cable roads of them, as well as the proposed extension of existing cable roads, will give plenty of work to mechanics this summer.

There is a good storage of snow in the mountains this winter, and the water supply for the coming season will be abundant. Water-power is much more largely used than formerly in this State for mining quartz mills.

A METEOROLOGICAL SOCIETY station has been established on the grounds of the State University at Berkeley, in connection with the observatory on the hill north of the North Hall building. It is in charge of Professor Frank Soule. Daily barometrical and thermometrical records, as well as those of relative humidity and precipitation, etc., are kept.

Free Trade and Bimetallism in England.

"Lo! after these many days," England, for so long a time the staunch and inflexible advocate of monometallism and free trade, is beginning to go back on her favorite theories, which there is now reason to believe she will soon be forced to abandon altogether. Her manufacturers are everywhere clamoring for protection, and almost the entire business community for the remonetization of silver. Protests against the admission of free goods and the exclusive use of gold, which only a short time since were few and feeble, being treated with derision when heard, are now loud, numerous and persistent, showing a settled purpose on the part of the protestants to force an early repeal of these obnoxious measures. In a few years more the policy of England will, beyond any question, be in accord with that of the United States, on one and perhaps both of these questions. While it may take a little more time for her to abandon or radically modify her free-trade doctrines, the reinstatement of silver into the currency of the realm will very likely occur within the time mentioned, many of her leading financiers and publicists having declared strongly in favor of such course. It is expected that a royal commission appointed to inquire into the expediency of restoring silver to its former function in that country will report in favor of the same. Should they do so, action favoring the remonetization of this metal would, presumably, be taken in both France and Germany, both of which countries have the matter now under consideration.

The English are notoriously a slow-moving, not to say an obstinate, people. Once committed to a practice, or even a theory, John Bull adheres to it with a pertinacity that nothing but the most obvious self-interest can overcome, his pride of opinion sometimes preventing his yielding even to this. Once resolved upon a change, however, our English cousins are not slow about carrying it out. Hence the probability that England will soon return to the double standard. That the free coinage of silver in this country will ultimately be restored may now be accepted as a foregone conclusion. To this fact, coupled with the improved prospects of silver in insular and continental Europe, is due the recent appreciation in the price of that metal in all the markets of the world. As the attempt to ostracize silver in the United States has been given up as hopeless, so also it may be expected that further opposition to its unrestricted coinage will here meet with early abandonment.

Cable Roads.

San Francisco is noted everywhere for her splendid system of street railroads operated by underground cables. There is probably no better street railroad in the world than the Market-Street line, in this city. The cars are roomy and clean, run frequently and fast, the track is smooth and the fare cheap. Visitors here ride on these cars for the mere fun of riding. The several other roads in the city, combined with the different lines of this one, give access to portions of the city which were before their construction comparatively valueless. Large areas of land have been made available for residence purposes, and the growth of the city largely extended by reason of the presence of these roads.

It is now announced that the Market-Street Company, or its managers, have secured the control of other roads in this city, and those which have heretofore been operated by horses will have cables instead. They paid \$1,000,000 for the Mission-Street horse-car line and will put in a cable. The Turk-Street or Central line, operated by horses, will also be made a cable road. The Geary-Street road, one of the purchases, is already a cable road, but will be greatly improved. The Sixth-Street line is a good piece of property included in the purchase. The rebuilding and equipping of all these roads will be a good thing for the mechanics and laborers of this city, as the new owners care to have nothing but first-class work done. All these plans show the confidence of capitalists in the present and future of San Francisco.

HENRY WARD BEECHER, the most noted clergyman in America, and one of the greatest orators, died at Brooklyn, N. Y., on Tuesday morning last.

Mining in Sonora, Mexico.

Mr. T. G. E. Wolleb, who is well known in this city, has been for some months engaged in mining near Hermosillo, Sonora, Mexico, and came to San Francisco last week for the purpose of purchasing some machinery for opening a small mine. In an interview with him, some points were elicited which may be of interest to mining men. On asking him if there was much mining going on around Hermosillo, he said:

"Well, no; there is not much mining going on there—not much serious mining. The Mexicans are scratching around some, but it does not amount to much. As soon as they have lost a pay ledge they do not go far; they soon give it up. An American who is willing to do some good work has a good chance there. There was a mine which they had worked some and given up. From the general outlook, I considered it was a paying ledge, and went at it. I sank only some 50 feet through the rock, and when I struck paying ore, they thought it was remarkable."

"Are there many claims of that kind here?"

"Yes, there are a good many abandoned mines—mines that have been worked some and given up. I have been offered one in Sahuaripa. It is an American doctor who gave me the description of it, but I have not seen it. He says it is a gold quartz ledge about 15 feet wide, and the rock averages \$40 to the ton. There is wood and water in abundance, and it is only two days from Las Prietas, with a good road. That mine was abandoned on account of the Apaches. These Indians were, as you know, very troublesome for a long time, but there is little trouble from them now. The Mexicans stand in great fear of them, and would not go in there for love or money. This doctor spoke to me of another mine, a ledge some eight or ten feet wide in quartzite and granite. There is water enough there, but it is some 60 miles from the railroad, and in a rough country. All these mines I have spoken of are in 'the Apache country,' which is one reason why the Mexicans have not worked them more."

"Are these opened or developed mines?"

"Some of them are open mines and some are not. The mine I spoke of working has been opened by others."

"Are there many Americans down there?"

"Yes, some; but people seem to be afraid of the Mexicans. They talk about the Mexicans coming in and driving them off, and all that sort of thing. I think it is all hosh. If they treat the Mexicans decently, it is all right. Of course there are a good many rough characters that come in there, men who have 'left their country for their country's good,' and so on, and they often get into trouble with the natives. But if one treats the Mexicans fairly, and lives up to the laws, he will find little trouble. The Mexicans are smart enough to distinguish decent people from the roughs. There is some talk of organizing companies to take up mines, but there is no need of that—every one can do it. If you observe the laws strictly and mind your own business, there will be no trouble."

"Some of these mines are pretty rich, is it said?"

"Yes; Las Prietas takes out from \$60,000 to \$80,000 every month in gold, and ships it. There is an American who ships from Hermosillo nearly a carload of argentiferous lead ore every day."

"In taking up a mine, either abandoned or otherwise, what is the mode of procedure?"

"You have to file a notice with the recorder of the district, in duplicate, and that notice is advertised by posting it at a public door, or in some other conspicuous place, and you have four months' time in which to open the mine. After awhile the mine is visited by the recorder and measured, and possession is given, if there is no other claim. You have to do a certain amount of work every six months, in order to hold the mine."

"You were speaking the other day about some large mine; where is that?"

"I was speaking of a gold mine; it is at Las Delicias. The mine is called St. Helena, and the ore is worked at Las Delicias. It is worked by a Boston company, which has spent over \$1,000,000 in opening and working it. It is in the district of Arisaps. It is worked according to the Boston metallurgical system, which consists in taking out \$4 per ton, and leaving \$8 or \$10 more in the tailings. They have tried different kinds of machinery and various processes,

and have lost lots of money in it."

"Is it all gold?"

"Yes, it is all gold in that mine. They have a whole mountain of quartz to work on."

"You are going to take a rock-breaker back with you, I understand?"

"Yes, I am here for the purpose of procuring some small machinery; but first I mean to sink lower down on my ledges. Now about these gold mines—if any decent man wants to go in with me, I can put him on track of some good openings."

"The gold deposit you mention is in the Sierra Madre, is it not?"

"It is mostly in the Sierra Madre. It is in the valley of the Rio Sonora, which comes down from the line."

"That region has been practically abandoned for many years, has it not? It is only within a short time that much prospecting has been done?"

"Yes, because the Mexicans are very much afraid of the Indians. There is not much danger from them now, though there is said to be a band of Apaches in that section; but it is not probable."

"The country is now safe, then, for prospectors to go into?"

"Yes, reasonably safe; and considerable prospecting has already been done in the Sierra Madre. I have been told that on the other side men have prospected for years and yet have found nothing. I have been advised not to go into the Sierras prospecting at all. Men have told me that they have worked and prospected for years with no result. And then others will tell that they have seen a ledge 40 feet wide, with plenty of wood and water, but that it was in the midst of the Apache country. They will be willing now to show you the place for a consideration. Of course, these people are not always to be depended upon, and if such a mine is offered to me I shall send some one I can depend upon to see it and report. The Mexicans, especially, are unreliable. They are not even to be relied upon as laborers; they will leave you at any time, often when you are most in need of them. They have even learned to strike, and will often quit work unless you raise their wages."

"Most of the mines are carried on by Mexicans, are they not?"

"No; I know of five or six American companies—Eastern companies—with large capital. There are quite a number of English companies, too. The principal company is English—in Trinidad. They have spent over a million and a half on their mine, and over \$100,000 on a road alone."

"Is there anybody from this State down there that you know of?"

"No. Californians are very few in numbers down there. But, by the way, it was only a few years since that a 'California mining expert' was there who astonished the natives. He lived high, drove around town in a four-horse carriage, and cut a swell generally. He hired a brass band to play for him daily, gave the boys \$5 for holding a horse, gave the hand-leader \$20 extra when a piece of music pleased him, and acted generally in an extravagant manner. It was done to impress the people with his own importance and the liberality of his company. He is said to have spent some \$8000 before he saw the mine he was to 'expert' on, but the venture never came to anything."

"How do you go down into Hermosillo?"

"We go by Southern Pacific to Benson, and then by the Sonora railroad to Hermosillo. It takes three days and nights from this city."

"Are there many foreigners down in Hermosillo connected with mining matters?"

"There were last year a good many—some Englishmen, some Frenchmen, and other nationalities. Just now there is a good deal of French capital going into Lower California."

"You think, then, that there is a good chance for some one to get bold of small mines?"

"Yes, or even large ones."

"A good opportunity for the investment of capital there?"

"Yes; but so much capital has been invested there and lost, either by careless investment or poor working, especially by Eastern companies, that people are a little afraid of it now."

"They brought out Eastern people to work the mines, I suppose?"

"Yes. Eastern people think they know more about mining than any one else, and

MECHANICAL PROGRESS.

Man-Hole or Hand-Hole Plates.

It is a mistake, says the *Locomotive*, to suppose that because a man-hole or hand-hole plate is packed with a gasket made of rubber or other yielding material, that any sort of surface on the plate and frame or ring is good enough to insure a tight joint when the plate is screwed up, for it is far from being the case. A man-hole plate and ring should each have a flat, smooth surface, for then a joint can always be made perfectly tight with a minimum amount of screwing up on the plate. Where the frame is uneven it is quite possible to screw up a plate with sufficient force to crack the ring, and some very destructive explosions have occurred from this cause. This is especially apt to occur where the frame is one of the ordinary external kind, for then the weakest part of the frame, owing to the convexity of the shell, is exactly where the greatest strain from steam pressure occurs, and as such frames are generally constructed they are altogether too light to give a proper margin of strength. It should not be forgotten that the cutting out of the shell on top for a man-hole weakens it very much, and the man-hole frame should be strong enough to restore the full amount of strength thus lost. This is best fulfilled by an internal frame, for, although the internal frame is much more inconvenient for entering the boiler than the external one, its strongest part comes just where the greatest amount of strength is needed, and it should always be used on boilers over 36 inches in diameter.

When a joint supposed to be well packed leaks when steam is raised, excessive tightening up of the plate should not be resorted to; the pressure should be relieved, the plate removed and the joint examined to discover the cause of the trouble.

Hand-holes, although they require no strengthening ring to compensate for the loss of material where they are cut out, should, nevertheless, be very carefully made. Especial attention should be given to making a smooth seat on the interior surface for the gasket to rest against. This is, of course, an easy matter to attend to in new work, but, as often happens where a hand-hole is cut in the back head of an old boiler, and the iron is laminated or of an inferior quality, it is not always an easy matter to make a good job. Under such circumstances it is sometimes nearly impossible to get a smooth seat. When this is the case it is very difficult to pack the joint so that it shall be tight with the ordinary rubber gaskets found in the market. Unless it is tight, corrosion very soon completes the bad job already begun, and in many cases a patch on the head has been found necessary. All this may be avoided by the exercise of care and a choice of suitable material for packing.

PROPERTIES OF MANGANESE STEEL.—Prof. W. F. Barrett has investigated the physical properties of manganese steel, and given his results in a paper to the Royal Society of Dublin. Two wires of No. 10 S. W. G. gauge were drawn for him by the makers of this steel, Messrs. Hadfield & Co., of Sheffield. Their density was 7.808, and one was softened by sudden cooling; the other was kept hard. It is a peculiarity of this steel, which contains from 12 to 14 per cent of manganese, that sudden cooling softens it, whereas slow cooling hardens it. No. 19 wire was found to have an electrical resistance of about one ohm per meter. The specific resistance in C. G. S. units was 77,000 for a cubic meter. Ordinary iron is only 9800. Mr. Barrett recommends it for electric light resistance coils. The steel is very slightly magnetic, its susceptibility to induced magnetism being only 300, as compared with 100,000 for iron; hence it is adapted for dynamos, head-plates, and ships' hulls. The tenacity of the hard wire was found to reach 110 tons per square inch, whereas the soft wire had a tenacity of only 48 tons per square inch. The modulus of elasticity was found to be lower than that of wrought iron, the mean number for the hard manganese wire being 16,800 kilogrammes per square millimeter, while the soft wire had a lower modulus. The modulus for ordinary steel wire is 18,810, and for iron wire 18,610 kilogrammes per square millimeter.—*Engineering*.

AMERICAN MACHINERY IN EUROPE.—The ingenuity of American inventors is making itself felt in the manufacturing districts of Europe, and it is expected that the coming American exhibition in London will more materially impress this upon all those engaged in mechanical industries. There is a peculiar pleasure in noting the growing favor which is being accorded to the clever devices that originate in this country, in the old manufacturing provinces on the other side of the Atlantic. We hear much about the superiority of European machinery over that made in America, but however true this may be in certain particulars, it is equally clear that in contrivances which contribute toward increasing the productive capacity of a machine, by accelerating the speed and facilitating its operations, Yankee ingenuity has no equal in the world. The machine-shops of England find profitable employment in turning to practical account many of the inventions that had their creation in this country and found their first record on the books of the patent office at Washington. In one of our

recent English exchanges the existence of this state of affairs was especially brought into notice by elaborate references to several important American inventions, one of which, but little known outside of cotton mills, was the gravity spindle for the cotton ring frame, which has come into general use in English manufactories.

Choosing Material for Gaskets.

The choice of a material for gaskets cannot be too carefully made. The material should be yielding, elastic, tough, and these qualities should not be very much affected by the temperature of steam at ordinary pressures. It should be yielding, because this property enables it to adapt itself to any trifling inequalities of the seat or surface of the plate, thereby insuring a tight joint with a minimum of trouble. It should be elastic, to enable the gasket to accommodate itself to slightly different sizes and shapes of man-holes of the same nominal size. It should be tough and strong, as this is most important to prevent serious accident, and if it is affected by slightly by a temperature of, say 350 degrees Fahrenheit, a gasket may, if care be exercised, be used repeatedly, which is quite an important item when there are several boilers and the water is so bad as to necessitate frequent opening for cleaning purposes. Such gaskets can be procured without much trouble, but to tell the truth, those lacking most, if not all, of the above desirable qualities are much more readily obtained. We have before us, as we write, a portion of a gasket which came very near causing serious trouble, a short time since. Owing to its weak and incompressible nature a portion of one of the man-hole gaskets blew out, and the shock was so great when it let go that all the seams of the shell were so sprung that it was necessary to calk them, and the tubes were loosened so that they had to be rolled before the boiler could be used again. The boiler was an excellent one, or the probability is that it would have been ruptured and an explosion would have resulted from the shock. It is very likely that many explosions have resulted from this cause alone.

Standard Screw Threads.

The late Sir Joseph Whitworth was the first to inaugurate a system of standard screw threads. The form of thread and the number of threads per inch which he recommended were based partly on the results of numerous experiments and partly on the average obtained by comparing the various forms of screwed bolts then in use. The Whitworth system has been very generally adopted in all parts of the civilized world except the United States. The Sellers system, introduced here in 1864, has the same number of threads per inch, but the form of the thread is different.

Hydraulic Steel.

The last work of Mr. Whitworth was the production of his hydraulic steel. He hailed the advent of the Bessemer steel process with ardor, but found its defects in the blow-holes in the metal. He devised a press by which he subjected the molten metal to a pressure of six tons to the square inch, thus doing away with blow-holes and increasing its strength immensely. One of his presses was called the 8000-ton press. The results were extraordinary. The shafts of many steamers were made of this metal, those of the City of Rome and the Inflexible among others. In 1877 he applied it to armor plate. In 1868 he founded 30 £100 scholarships, which, by his advice, counsel and donations of exhibitions to competitors, he fostered personally throughout his active days. They were designed to train young men in technical work, which he recognized as one of the needs of England. His horonety, which expired with him, he received in 1869.

ERIE'S GREAT INDUSTRY.—It is not generally known that Erie, Pa., produces more engines and boilers than any one city in the United States. There are nine foundries and machine-shops, the largest manufacturers of engines being the Erie City Iron Works, the Stearns Manufacturing Co., the Skinner Engine Co., the Nagle Works and the Ball Engine Co. The capacity of the nine shops is 10 engines a day, or about 3000 a year. Nearly all the shops make a specialty of sawmill engines—very heavy and especially adapted to the extraordinary strain the sawmill engine is subjected to, at one time doing its utmost and at the next instant idle.

TO TEST KEROSENE OIL.—Manufacturers of kerosene oil say that all lamps are safe with good oil, and that the quality of oil can be ascertained by the following test: Take a pint tin cup, fill it nearly full of water warmed so that an ordinary thermometer immersed in it will show 120°, pour a small quantity of oil on the water, stir it a little, then pass a lighted match quickly but closely over the surface of the oil once; if it ignites, the oil is unsafe. If purchase are made of from 3 to 5 gallons at a time and this test is made, people can protect themselves.

THE WIRE NAIL TRADE is rushing into prominence as a consumer of wire and wire rope. It was recently stated on good authority that in 1886 the output of iron nails was 600,000 kegs, against 400,000 in 1885, and that it is expected that fully 1,000,000 kegs will be reached in 1887.

SCIENTIFIC PROGRESS.

Chemical Action in the Soil.

The chemical action which plant food undergoes in the soil to prepare it for assimilation by the plant is given by a correspondent of the *German Town Telegraph* substantially as follows: The active cause of the chemical action of the acids and alkalis in the soil seems to be totally misunderstood or entirely unknown by most writers upon the subject. Water in moderate quantity, or more properly *moisture*, is the prime requisite. Heat, or more properly *warmth*, is perhaps equally important. Neither of these alone will cause the needed reaction, or, if any does take place, it will be too feeble to be of any value to plant growth. When, however, the two are present in suitable proportions, every invigorating quality in the soil becomes at once active—destructive fermentation commences, the general fertilizing properties are broken down, mixed together and reduced to that condition in which only they can become really plant food.

Plants cannot absorb dry substances, neither can they absorb wet substances if too wet. They must have their food mixed in perfect proportion to be able to grow well. If their food is too dry, the roots die outright; if it is too wet they must gorge themselves to obtain enough real nourishment. In the first case they dry up; in the last one the circulation is all water, which is *no food*, then they die. The talk about gases in the soil is all hosh. Plant food is neither wind nor water; it is a pabulum or pap, consisting of the especial article—humus—slightly diluted with water, merely as a lubricator to enable it to flow through the plant's circulating passages, and become eliminated on its passage. Put a handful of dry meal into one's mouth. What is the first call? Water, of course; not a flood, but just enough to moisten it.

THE WAVE OF COMPRESSION.—When a pile is struck on the top, what is known as a wave of compression passes through it, says *Engineering*; and this wave requires time for its passage. Such a wave is set up in all columns when stress is suddenly brought on one end. Thus, for example, if the muzzle of a fowling-piece containing a column of air is plugged up with a cork, or with snow or mud, the barrel may be hurst when the weapon is fired, simply because, while the pressure at the muzzle is yet too small to move the cork, the pressure at the breech end is great enough to burst the barrel. The wave of compression will not reach the muzzle till the breech has been hurst. In the same way the detonation of a lump of dynamite on a rail will break it, the action being so sudden that the wave of transmission of pressure has not time to pass through the air surrounding the dynamite, and the air really plays almost the same part as a block of steel round the explosive. The effect of a heavy ram falling a short distance on a pile head resembles a push, in a sense, and gives time for the transmission of the effort throughout the whole pile, but when a light monkey falls, the effect may be confined to the top of the pile, which is shattered. In order to make this quite clear, we must take into account the element time, concerning which we have said nothing yet.

SCIENTIFIC REWARDS.—The prizes which have been bestowed by the French Academy of Sciences form a long list, one of the most important of them having been that given a few years ago to Prof. Ball for his work in connection with the telephone. Those offered for 1887 include 100,000 francs for the discovery of an efficient remedy for Asiatic cholera; 10,000 each for the best works of physics, chemistry and physiology; 7500 francs for work on general embryology; 3000 francs for researches on the phosphorescence of animals; 3000 francs for a comparative study of the hearing apparatus in mammals and birds; 3000 francs for a comparative study of the fresh-water animal life of Africa, South Asia and Australasia; 2500 francs for an improvement of the steam engine, or other invention contributing most to the progress of steam navigation; 2000 francs for any valuable therapeutical discovery; 2500 francs for work on the distribution of heat over the globe's surface; 500 for a theoretical and practical study of progress in aerial navigation since 1880; besides many others, ranging from a set of Laplace's works to 10,000 francs, for specified work in mathematics, astronomy, chemistry, botany, medicine, mechanics, and other sciences, and in aid of scientific students. Papers are to be handed in before June 1.

INFLAMMABLE BREATH.—There is a brief reference in a recent number of *Science* to a remarkable case in which the breath of an individual, or rather the eructations of his stomach, took fire when brought in contact with a lighted match. This case, which was reported in the *Medical Record*, has called forth communications from physicians by which it would appear that the phenomenon is not such a rare one as was at first supposed. In one case of disordered digestion the patient emitted inflammable gas from the mouth, which, upon analysis, was found to be largely composed of marsh gas. In another case the gas was sulphuretted hydrogen. A case is reported in the *British Medical Journal*, in which, while blowing out a match, the patient's breath caught fire with a noise like the report of a pistol, which was loud

enough to awaken his wife. One evening, while a confirmed dyspeptic was lighting his pipe, an eructation of gas from his stomach occurred, and the ignited gas burned his mustache and lips. In Ewald's book on indigestion, the analysis of the gas in one of these cases was: carbonic acid, 20.57; carhuretted hydrogen, 10.75; hydrogen, 20.57; oxygen, 6.72; nitrogen, 41.38; sulphuretted hydrogen, a trace. The origin of these gases is undoubtedly the undigested food, which in these cases undergoes decomposition.

DO BIRDS FLY DOWN?—This query has recently been made a subject of some considerable discussion among scientists and observers. Mr. C. F. Holder writes as follows in *St. Nicholas*: I see, in a back number of *St. Nicholas*, that one of your correspondents appeals partly to me in regard to birds flying down. But all who have written seem so well posted that I doubt if I can add anything to their knowledge. However, I have seen a California quail, a wood-dove, and a humming-bird flying downward; but in slow flyers, with large wings and heavy bodies, the wings are used more or less as parachutes in going down; in other words, the birds spread their wings, and rely upon gravity. This I have noticed in the sandhill cranes in their migrations along the Sierra Madres. A flock, of say a hundred, will mount upward in a beautiful spiral, flashing in the sunlight, all the while uttering loud, discordant notes, until they attain an altitude of nearly a mile above sea level. Then they form in regular lines, and soar away at an angle that in five miles, or so, will bring them within 1000 feet of the earth. Then they will stop and begin the spiral upward movement again until a high elevation is reached, when, away they go again, sliding downhill in the air, toward their winter home. It is very evident that a vast amount of muscular exertion is saved in this way. In some of these slides that I have watched through a glass, birds would pass from three to four miles, I should judge, without flapping the wings.

LUMINOSITY OF THE OCEAN.—This proceeds from a great variety of marine organisms, some soft and gelatinous and some minute, shelly animals. They mostly shine when excited by a blow or by agitation of the water, as when a fish darts along, or oar dashes, or in the wake of a vessel when the water closes on its track. There are few subjects of study more interesting to passengers crossing the Atlantic than the luminous appearance thus presented by the sea. That water, the great extinguisher of fire, should be turned into flame; that the darkness of night should be illuminated by the luminous glow which bathes every ripple and breaks on every wave, or that lightning flashes should coruscate no less in the billows of the sea than in the clouds of the air, are facts which seize on the imagination. Nor is the interest lessened by the knowledge that all these phenomena are produced by animals whose home is in the great waters; that not only the fiery bodies of large animals give out steady patches of light, but that of the myriad animalculæ with which the sea teems, like motes in a sunbeam, each contributes its tiny scintillation, the aggregate forming a soft and lovely radiance.

PUMPING WATER UNDER PRESSURE.—The following theory as to the probable cause of the recent bursting of the Sheephead hay stand pipe, communicated to the *Scientific American*, is certainly a very reasonable one, and one which affords much food for thought in regard to the general practice of pumping water under pressure. The theory is given in the following words: "The actual cause of the bursting of said pipe, I believe to be the vibrations of the water inside of the pipe, caused by and from the action of the pumps, by which motion on the stroke or discharge of the pumps, the water in the tube would have to rise, and on the receding motion would drop back, which rising and falling motion would cause a greater strain on the pipe than if it had been full of water, said vibrations being kept up until there was gained a regular rising and falling motion of water in the pipe. Hence, also, the rumbling noise heard in the pipe, and the bursting force."

INFLUENCE OF ELECTRICITY ON DELICATE WEIGHING.—M. Hennig de Wurtzbourg having noticed some incomprehensible differences in the weights of equivalent quantities, undertook investigations, which showed that balances of precision are often influenced by the electric state of the glass case which surrounds them. This electricity influences the "riders" which slide on the beam of the balance. The error resulting from this influence may amount, it is said, to 600 milligrams when the case is strongly charged, and two hours afterward there may still be an error of 10 milligrams.

CURIOUS SCIENTIFIC FACTS.—The fact has been satisfactorily established, by various scientific researches, that many substances absorb luminous rays during the day, and at night emit these rays in such a manner as to impress photographic plates, although they may not be perceptible to the unaided eye. Artists have not only succeeded in photographing the visible night phosphorescence of Mont Blanc's summit, but have even secured an impression of a mid-night landscape—invisible to the eye—on the terrace of the observatory at Prague.

PROF. HUGHES says a silk ribbon is a better lightning conductor than a metallic rod.

ENGINEERING NOTES.

LOCOMOTIVE ENGINES.—What an easy thing it is to pilot a crowded ferry-boat across the bay and into her slip without a hump or a shock. If you don't believe it, says an exchange, try it! Also, what an easy thing it is to drive a locomotive. Pull a lever, and away she goes. Pull another, and she slacks up and stops. That's all, as most people look at it; but it is not all by any means. The quick eye, firm hand, and steady courage, the knowledge of every mile of the road, the sharp lookout for signals, the putting on steam upon up-grades and shutting it off on down-grades, the difference of expansion in the rails between hot and cold, wet and dry, and the ever-present feeling of responsibility for peril of life, limb and property—all these are matters unknown to the mass of the people who pay their fare, take their tickets, and get to their journey's end. Their lives, nevertheless, have all the while been in the hands of a rough, grimy-looking man in the engine-cab, whom, if they meet on the platform, they avoid lest they should soil their silks and broadcloth by the contact. These men should be, and often are, scientifically educated; but they have no very high social position, and their wages are quite inadequate to their responsibilities. The gentlemanly conductor, however, with his regulation uniform and well-displayed watch-guard, is a personage of consideration, the petted of passengers and respected by directors. The engineer is a mere "mechanic!" The world is full of irregularities and injustices.

THE THIRD ALPINE TUNNEL.—The attention of Paris is at present fixed on a scheme of competition with Germany by means of another Alpine tunnel through the Simplon, as a rival of the successful St. Gothard. The latter furnishes a short cut for German goods into Italy, and has seriously diminished French trade with the peninsula. It is estimated that the Simplon tunnel would shorten the time between Paris and Central and Southern Italy by three hours as compared with the St. Gothard line, and the gain over the Mont Cenis route would be still greater. The length of the tunnel would be about 12 miles, and the whole work could be done in from four to six years. It would be the longest tunnel in the world, and require extraordinary provisions for its suitable ventilation. This object could be attained, it is believed, by means of a horizontal air shaft above the crown of the tunnel and running its entire length, connecting by a series of vertical shafts with the atmosphere above the mountain. Pumping engines would not only keep the air constantly renewed, but would draw off the water which otherwise would steadily accumulate in the tunnel. Similar difficulties have been successfully overcome in other tunnels. The cost of this immense work is provisionally put at \$14,000,000 to \$16,000,000. If the Government should decline to be associated with the job, it is believed there would still be no trouble in procuring the money.

INCREASING THE SPEED OF VESSELS.—For 20 years L. P. Rider, of Pittsburgh, has been making experiments with the object of increasing the speed of vessels and lessening their draft by a change in the formation of the hull. At last he has constructed a boat with which he will make a test as soon as the river is free from ice. Engineers pronounce his theory a correct one. The boat, which is 36 feet long, is known as the "concave bottom," the hull being built in a right and left hand spiral form from the bow to the middle section. The conformation of the hull is such as to displace water in a manner closely approximating to the "wave line" theory, beginning at the cut-water. The displacement is accomplished gradually until the center of the boat is reached, when the reverse action of displacement begins. The concave begins where the convex ends. The greater speed the greater the lifting power, the boat rising on the water and consequently moving with greater speed without any increase of power.

A THREE-CYLINDER LOCOMOTIVE.—One of the latest innovations in locomotive building is a three-cylinder locomotive built by the Dunmore Iron and Steel Company for use in switching in its yards. It is thus described by the superintendent of the works: "This little engine has three 8x12-inch steam cylinders, four 33-inch driving wheels, two outside connecting and parallel rods, and one inside connecting rod. No balancing is needed in driving wheels. The engine has six exhausts to a revolution, and the effect on the fire is good. It is claimed that by setting the cranks at an angle of 120 degrees the slip is reduced to a minimum. This engine makes 30 miles an hour on a 40-foot grade easily, with a light load, and is considered a good machine by those who have run it. Its weight is about 12 tons."

RAILROAD EXTENSION TO UKIAH.—The surveys, plans and specifications for the extension of the Donahue road from Cloverdale to Ukiah are now completed, and work upon the same will be commenced as soon as the right of way can be properly secured. The work will involve a length of 4800 feet of tunneling, but the grade thereby will be unusually favorable. Arrangements to connect this road with the Southern Pacific from a point between Pacheco and Novera are also completed, and the work of extension will be commenced within 30 days.

GOOD HEALTH.

"Has Cancer Been Cured?"

In continuing the subject of cancer treatment as commenced in these columns in our last issue, we submit the following notes of some few cases which we think would well repay a thorough investigation by the medical faculty. The notes of these cases have been taken by competent medical authority from direct statements of the patients themselves, and practitioner and patients are anxious that a searching inquiry should be made by any medical practitioner so desiring. The true function of science has been, and ever will be, to collate facts, and to seek them with avidity from all sources, and, by careful study and digestion, deduce such general principles as may promote the welfare and power of the human race. The devotees of this spirit are scientific men; those who abnegate it can have but little share in the world's progress, and are practically pretenders and charlatans.

Mrs. Henderson, 1014 Powell street; age 45; three children; operated on June 28, 1885; then on Feb. 3, 1886, by Dr. Robert McLean; put herself under the treatment of a certain practitioner on April 12, 1886, as Dr. McLean had proposed to operate for the third time. Incision in left breast discharging, and the right breast becoming involved. Seven weeks under treatment. No return. Both breasts now healthy.

Mrs. Dr. M. E. Edmonds, 330 Sutter street; attended by Dr. Pease, Oct. 2, 1882; left breast, tumor egg size, very painful; he administered carbolic acid mixture internally. Dr. Fraser recommended operation. Dr. Max Werder said it was a malignant tumor. On December 22, 1882, placed herself under special treatment; first application relieved pain (many patients have so expressed themselves), and tumor gradually disappeared. Recollects having a blow, from a little boy, in this breast; says it was above the nipple; was unattached and movable. No return; breast healthy.

Mr. G. F. Willis, 634 Second street; age 65; noticed a small growth on lower eyelid six years ago, bleeding; grew to the size of top of little finger. Dr. Palmer (Mason and Taylor streets) wanted to operate, October, 1885. Three weeks under special treatment; tumor came completely out. No relatives have had cancer.

Mrs. Jennie Fonda, 124 Eddy street; age 40 years; married; three children. Ten years ago attended by Dr. Kenyon; ordered applications; said later on that it was cancerous and the breast should be removed; darting pains; lump was as large as her closed hand, and very hard. She then placed herself under special treatment; tumor gradually disappeared, and there has been no return.

E. Richards, 619 Montgomery street; age 55; no relatives that he can remember have had cancer; first noticed a small red pimple under left eye, eight years ago; began to grow larger three years ago; much pain; size of top of little finger; spread out and grew very fast. Dr. Stamboul said: "Richards, you must have that cut out; it's one of the cancer family. Dr. Murphy and myself will cut it out." He then sought out — on the recommendation of a friend whom he met at a restaurant; attended twice daily for 16 days—30 days in all; it "dropped out" on the sixteenth day, and has not troubled him since.

Mrs. Hannah Pleasant, 216 Twelfth street; age 41; four children, youngest four years. Tumor in left breast, not very hard; nipple retracted; only slight pain through nipple, size of large coffee-cup; growing quickly; first noticed eight months ago. Dr. McNutt wanted to "cut it out," Aug. 3, 1886. Dr. J. F. Moras said, "Cut both breasts out;" Dr. Whitwell, "Cut it out;" also Dr. Morley, Dr. Prince, Dr. Ward, Dr. Lane. Dr. Donnelly said, "Let it alone." Put herself under special treatment, Sept. 2, 1886; diminishing in size and softening.

Mrs. Williams, 413 Ivy avenue; age 44; four children, youngest five years. No cancer in family. Dr. Sweetland pronounced it uterine cancer, and proposed Dr. Hutchins; called in Dr. McNutt, who did not think her strong enough to stand an operation. Much pain, local and in back; discharge not foul; never had hemorrhages; menstruation regular. Placed herself under special treatment; glands becoming enlarged and tender. January, 1886, perfect recovery.

Mrs. M. H. Keane, 1006½ Washington street; age 50; four children, youngest 15. Nine years ago observed a small lump in right breast, slightly painful, size of hickory nut; saw Dr. Lane; he said it was cancer; that she could not live a year, and if operated on would have to be done again, as it was incurable. Dr. Toland also said it was cancer; proposed operation; Dr. Plummer and Dr. Ferrer same. Saw Dr. Lane again May, 1879, as it had grown to size of large coffee-cup; was very hard; adherent to breast-tissue, and glands swollen and tender; no break on skin. Two months under treatment; has perfectly disappeared; no return.

Mrs. Annie Cornow, 513 Eleventh street; age 43; four children, youngest 4 years. No cancer in family. First noticed in August, 1883; very painful at first, then got hard; saw Dr. Parker, Virginia City; used iodine; grew rapidly; "lanced it six times;" saw Dr. Lane on her return to the city; he proposed "to cut it off or scrape it;" axillary glands enlarged and pains radiating; the lancet-holes in breast discharging freely a watery, blood-stained fluid. Three

months under special treatment; no return; breast healthy, much scarred.

Mrs. A. J. Houghtaling, 1205 Taylor street; age 44; six children, two living; youngest, 2½ years. No cancer in family. May, 1886, first noticed tumor in left breast, painless; saw Dr. Clarke, Kearny street; proposed to operate; said it was cancer. Dr. Ayres, Washington street, proposed to "take the breast off;" grew to size of duck's egg; above nipple; nipple not retracted. June 1st sought special treatment; diseased mass came away entire, and left, cured, in August.

Mrs. A. Parker, 527 Grove street, S. F.; age 45; eight children, youngest, 5 years; grandfather on mother's side had cancer on nose; lived to be 82 years; uterine; pain local and in back, especially when tired; no discharge. Dr. Sweetland treated for ordinary ulceration or inflammation. Dr. Holdbrook, and afterward Dr. Hutchins, in 1881, pronounced it to be cancer, and amputated neck of uterus. Hemorrhages slight, but later on occurred at two weeks' interval for six months. Consulted Dr. Perrault, and six months afterward, applied for special treatment to the practitioner in question, who would not undertake the case. (Does not like to treat cases which have been operated upon or which have reached a late stage.) Went East for treatment; returned little better, and on April 16, 1883, applied again for special treatment and attended until August, 1883; cancer appeared on arm; it was healed also; large scar remains; no trouble since; looks very healthy and feels well.

Mrs. Amelia Cleverly, Alliance, Ohio; mother had cancer, from which at present she is free. In March, 1886, noticed a small, hard lump in left breast; shooting pains, not constant; went to Dr. Lane; said it was cancer; he could positively cure it by cutting it out. Dr. Fraser said it could be cured by cutting out. Dr. Roberts, Van Ness avenue, said it was cancer, and he could cure it by medicine alone. Applied for special treatment eight weeks ago last Wednesday; very hard and obstinate; would not absorb; was drawn out entire in four weeks; breast now healthy looking.

The above are but a few of the many other reports of supposed cures which are at our disposal, and which will be given in a future issue of this journal. In reply to several inquirers, we would remark that the name of the author of these apparent cures is, for proper reasons, withheld.

TALKING TO A DRUGGIST.—The Philadelphia Press very sensibly says: "Men who talk with or at a druggist when he is engaged at his business should in justice be held responsible for his errors caused by their impertinent intrusion upon his attention."

USEFUL INFORMATION.

Does Charring Timber Promote Durability?

The general belief has long been that it does, and in accordance with this conviction the practice has been widely followed. But a contrary view of the subject is taken by *Wood and Iron*. That journal says in a recent issue: "As charcoal would endure for ages in places where timber would decay speedily, the practice of charring the surface of fence-posts and other timber has been repeatedly recommended in books and ephemeral publications, as eminently worthy of universal adoption."

"The theory upon which such a recommendation is based would seem to warrant a confident expectation of satisfactory results in practice; but repeated experiments with charred timber have furnished conclusive assurance that the process will not promote its durability. Indeed, numerous experiments have shown that charring promotes premature decay. Two posts split from the same log may be set side by side in the ground, the surface of one being charred and the other not; and it will be seen that the charred post will perish before the other."

"The same is true of railroad ties and all such timber as may be exposed to the altering influences of wet and heat. Could the entire timber be changed from its perishable condition to one solid piece of charcoal, the durability would be promoted to a surprising length of time; but the strength of the material would be destroyed. When fence-posts or other sticks of timber are exposed to the rapid action of wet and heat, the surface will decay first. One might suppose, therefore, that when timber is enveloped by a layer of charcoal, the durability of the entire piece would be greatly promoted. And such would be the case were it not for the fact that the charcoal is not impervious to water; and as water reaches the timber below the charred surface, decay will commence soon after the grain of the wood has been exposed to the influences of the weather. When the change has once begun beneath the charred surface, the durable covering of coal will be of no service whatever in preserving any portion of the wood. Taking this practical view of the subject, it will be perceived that if only half an inch of the outside of a post be charred the post will not endure so long as if the same thickness of wood had been left uncharred to waste away by slower decay."

PAPER BOTTLES were patented in America in 1833. Their sale was not extensive at first, but now that European patents have been secured,

cured, covering nearly all fields of probable competition, the controllers of the patents, we are informed, intend to manufacture the bottles in large quantities. In the item of freight alone they will effect a saving of one-third less weight than glass or stoneware, and are, on the whole, less liable to breakage. Paper being also an excellent non-conductor, fluids stored in the air-tight paper bottles will withstand a more intense degree of heat or cold than they could endure without injury in bottles of any other material.

CEMENT FOR MENDING RUBBER AND LEATHER ARTICLES.—This composition may be used to repair the breaks in shoes or boots, and if used with care and intelligence, will prove a more expeditious way than sewing the rents or patches. The surfaces or edges to be brought together for cementing in this way should be pared or scraped, so that they will present a smooth joint or lap when cemented. Take one part of gum Para (which may be procured from dealers in rubber) and dissolve it in five or six parts of bisulphide of carbon (which may be obtained from manufacturing chemists at about 20 cents per pound or less). Then proceed as follows: Use a strong glass vessel that may be tightly corked or closed, and into this put enough of the small clippings or pieces cut from the gum, and upon this pour the given proportion of the bisulphide of carbon; then close the vessel tight. This solution is made without heat. The vessel should be taken up and shaken from time to time to facilitate the combination. The Para rubber is used instead of other kinds, as it is more flexible. Should the solution appear too thick, or become so in time, add a little more of the bisulphide of carbon. The solution must always be free from moisture. When this cement is made, keep it in tightly sealed jars.

TANNING TEXTILE FABRICS.—A Belgian inventor has devised a process for tanning textile fabrics which renders them waterproof and at the same time, it is said, proof against decay, while their suppleness is not diminished and their weight not appreciably increased. Arguing from the high state of preservation in which the bands which surround the heads of Egyptian mummies are found to this day, and which are impregnated with a kind of resin, the inventor had recourse to the substances extracted from birch bark and which are now used to perfume Russia leather. When the fine white bark of the birch tree is distilled it yields a light oil, nearly a fourth part of which consists of the special phenol, or carbolic acid, which gives the well-known odor to Russia leather. It is now found that the residue, or green tar, of the birch, which is obtained from Kostroma, yields neither acid nor alkaloid, and it forms, with alcohol, a solution of great fluidity, which, however, when once dried, is not acted upon by alcohol. It is this substance which will unite with the most brilliant colors that are used by the inventor for treating textile fabrics.

HOW THE GOVERNMENT CLEANS BRASS.—The government method prescribed for cleaning brass, and in use at all the United States arsenals, is claimed to be the best in the world. The plan is to make a mixture of one part common nitric acid and one-half part sulphuric acid in a stone jar, having also a pail of fresh water and a box of sawdust. The articles to be treated are dipped into the acid, then removed into the water and finally rubbed with sawdust. This immediately changes them to a brilliant color. If the brass has become greasy, it is first dipped in a strong solution of potash and soda in warm water; this cuts the grease so that the acid has free power to act.

CLEANING SHOW WINDOWS.—A good cleaning powder for show windows, which leaves no dirt in the joints, is prepared by moistening calcined magnesia with pure benzine so that a mass is formed sufficiently moist to let a drop form when pressed. The mixture has to be preserved in glass bottles with ground stoppers, in order to retain the easily volatile benzine. A little of the mixture is placed on a wad of cotton and applied to the glass plate. It may also be used for cleaning mirrors.

THE EYES IN DEAD PERSONS.—A Frenchman has found means to restore the life-like expression to the eyes of dead persons. He places a few drops of glycerine and water in the corners of the eyes and the effect is said to be startling, so life-like do the eyes become.

By washing a pine floor with a solution of one pound of copperas in one gallon of strong lye, the appearance of oak flooring may be produced.

ONION ROOTS.—A correspondent of the *Rural New Yorker* found onion roots a foot long and still going down, though too fine to follow.

THE LARGEST COPPER PLATES ever rolled were recently turned out in Pittsburgh. They were circular in form and 176 inches in diameter.

THE GOVERNMENT CHEMIST of New Zealand has proven that the dust of the recent volcanic eruptions is of great value as a fertilizer.

FIFTY THOUSAND TONS of soot were taken from London chimneys last year. Its value was set at \$204,000—as a fertilizer.

EXPERIMENTS made indicate that the light of midday during fine weather penetrates the water of the sea 1300 feet.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MISCELLANEOUS.—The South Spring Hill Co. is about to put in an electric light for both mine and mill, and also at the underground stations. Nearly all the machinery is on the ground. This is the first company in the county to light by electricity.

COSMOPOLITAN.—The sale of a mine on Dry creek, near the Potosi and Hercules properties, and owned by W. Jennings and others, has been effected to ex-Governor Hale, of New Hampshire, and other Eastern capitalists. J. R. Tregloan will look after the property. The sale of the Mahoney mine at Sutter creek was not consummated. The surface rock upon which the mill is kept running to its full capacity is paying considerable over expenses. One half of the last cleanup went to the stockholders as profit. An effort is being made to form a company to operate the North Star mine, which lies south of the Talisman. Since J. F. Parks assumed the superintendency of the Kennedy, Sunday work underground has been abandoned, a change which the miners appreciate.

MAHONEY.—In addition to the surface work progressing at the Mahoney, preparations are being made to take the water out of the shaft, perhaps not below the 500-foot level, as it is claimed there is enough rock above that level to run the mill for years. The pumps were connected this week, and run for a short time to see that everything worked satisfactorily. Laying pipe at the Wildman is completed, and miners are now putting in a few set of timbers near the top of the shaft, after which the pumps will be placed, and the taking out of water inaugurated. A light pump will be put in temporarily, and as soon as the water is out of Knight's patent hydraulic pumps will be introduced.

SUTTER CREEK.—Cor. Amador *Dispatch*, March 5: Ned O'Neil continues to work his gravel claim, known as the Night Hawk, with fair success. Messrs. Botto and Watkins are working a small channel of gravel near the top of Sutter bill, which pays good wages. Occasionally nuggets are found which weigh from \$4 to \$5 apiece. The once famous Con. Amador mine will soon be a thing of the past, as far as looks are concerned. The mill and mine are nearly dismantled, everything having been sold or moved away, which causes disappointment to overcast the countenance of the people of Sutter Creek who, for many years, have gained a livelihood from it. The Iowa M. Co. is moving its large building and whim from the west shaft to the north one, during which time the mill will remain idle. The North Star and Washab mines have consolidated and will soon start up. Mr. Seabrook has just finished a contract of hauling 40 tons of sulphurets from the Kennedy mine to the Amador Reduction Works.

Calaveras.

RED ROCK.—San Andreas *Prospect*, March 5: Of late, B. K. Thorn has been prospecting on his old mine near town, and has discovered some rich rock not far from the old shaft and hoisting works. Free gold can be seen in the rock and it will assay from \$20 to \$80 per ton. Mr. Thorn has had Ruel Chase repairing the buildings on the mine and intends to run a drift to tap the vein at about 50 feet from the surface. A small mill will be erected and the lead prospected thoroughly. There is no doubt but the rock will pay from the surface. Ben has spent considerable money on this claim. The Leonard brothers commenced work on their mine near town last Tuesday morning. They intend to sink on the vein and develop the mine as fast as possible.

El Dorado.

GARFIELD.—Placerville *Observer*, March 8: The Garfield mine is situated about one mile from Greenwood, and is the extension of the famous Cedarburg mine. This mine is now under the superintendency of T. G. Bilty, of San Francisco, who is at present engaged in thoroughly prospecting the mine. Three tunnels have been run, the main one now being in a distance of 675 feet, and is tapped by an air shaft from the surface. Mr. Bilty is now taking out some very good ore, but says he has not yet reached the main body of the ledge. The ore now being taken out is of low grade, but is good average milling ore. He expects to have the tunnel completed within the next 60 days and through to the main body of ore, when he says we may look out for startling developments.

TEXAS HILL.—Cor. *Mountain Democrat*, March 6: The storm closed down the mill at the Texas Hill mine for want of water, and we miss the clatter of the stamps. There is plenty of water now for ground sluicing, though the water is not yet in the big ditch. Mr. Parker is ground sluicing, and others are busy in this vicinity.

HENRY'S DIGGINGS.—Fine weather has come after the storm, and the miners who have been huddled together here are scattering for their homes and claims at Pi Pi, Brownsville, Dogtown, Mendon and Fairplay. The mines of Henry's Diggings are all lying idle, owing to the deep snow, but the Mt. Pleasant is running day and night.

Fresno.

MINERS ENOUGH.—Fine Gold *Miner*, March 4: As a friend of the laboring men we advise them not to come to Hildreth until other mining companies start developing mines, the town at present being full of idle miners. The following is the present extent of the different companies' pay-roll: McNally Co., 75 miners; Hildreth Co., 20 miners; James & Francis Co., 18 miners; White Rock Co., 25 miners; Mountain View Co., 12 miners; Quartz Mountain Co., 20 miners; Texas Flat Co., 60 miners; Zebra Co., 50 miners; McKenzie & Rule Co., 15 miners; scattering throughout the section upon different prospects, about 300 miners, and plenty of applicants on hand.

HILDRETH NEWS.—The owners of the Cascade mine have discovered a three-foot ledge in running a cut about 250 feet above their tunnel. The ledge is undoubtedly a feeder to the main ledge and assays \$30 per ton. The vein in the working shaft, the extension through the tunnel and the newly discovered croppings, develop the ledge 250 feet in depth by 100 feet in length. The ore in the tunnel is rich in sulphurets and mills \$45 per ton. F. Scully

and the Baker Bros. are the owners. The owners of the Morning Star have started sinking in the working shaft upon a two-foot ledge of quartz that mills \$30 per ton coarse gold and contains very good sulphurets which assay \$200 per ton. The gold in this vicinity averages \$16.40 per ounce. The owners have quite a large dump of ore that assays as stated, and the mine is regarded as a good property. The Rough and Ready prospect is considered the mine of the future in Fresno district at the present time. This property adjoins the Morning Star, and is most favorably situated for working the ledge to an advantage. As far as the ledge is concerned, this whole mineral belt contains as fine a milling quality of ore as can be found in any mineral district. The Rough and Ready ore is very rich in sulphurets, and taking an average sample of the ledge from the surface, from wall to wall, and the entire depth of the incline (100 feet) also in the intermediate drift (25 feet), the ore will mill \$40 per ton. The Taylor and Fraser mine is looking exceedingly well; the ledge in the working shaft improves as depth is attained. At present the size of the ledge, including clay selvage and other prospecting matter between the walls, is 5½ feet, containing a 2½-foot ledge of quartz of good milling quality. The owners are erecting houses for the men, and have just completed a fine wagon-road leading to the mine. The Promontory, owned by James Ryan, Hanlan, and the Baker Bros., shows up a well-defined and continuous ledge in their tunnel, thoroughly mixed with loose quartz, being in talc and clay and four feet wide between walls, the hanging-wall being in the sedimentary formation, while the foot-wall is composed of soft granite that resembles alabaster. Ledge samples of 20 pounds of ore average 25 cents to the pan or \$70 a ton, fine and coarse gold being mixed; not being below water-level, the owners have not struck many sulphurets. This property adjoins the Taylor and Fraser mine. The Hildreth mine was visited last Thursday by John McNally, of the Abbey mine, and to Mac's surprise the mine has improved 90 per cent in size of the ledge and development since last summer, under the management of Wm. M. Laverone. The superintendent of the James and Francis mine, Mr. A. McFadyen, stated that he expects, from the present indications, that the ledge would widen out from 9 feet to 12 feet between walls. The 9 feet of ore that was opened up last week in character and formation is entirely foreign to the district, being decomposed quartz containing one-half green talc mixed with a little soapstone, the high color, no doubt, being caused partly from the decomposed sulphurets. For the last 10 days nothing but ore has been hoisted. The company will sink the shaft 150 feet and then crosscut the pay chute, with drifts east and west to ascertain the width of the pay chute. The Wilson mine and property is another James and Francis mine in every respect, and from location and situation, although a mile apart, are undoubtedly on the same ledge. The ore of the Wilson is just as rich and about the same character of formation, and at present, at a depth of 85 feet of incline, the ledge between walls is two feet.

Inyo.

ORE SHIPMENT.—*Register*, March 5: S. A. Densmore made another carload shipment of ore from his San Carlos property, week before last. This was the second shipment for February, with a third one to be made still. The fact that but two men are employed speaks well for the mine.

LOOKOUT MINES.—*Independent*, March 5: Very good reports of mining interests come from Lookout. The late snowstorms have blocked the roads so that teams cannot haul ore to Keeler. At the Modock mine 35 tons are sacked ready for shipment and about 66 tons more are packed to the furnace. At the end of December, a prospect drift was started from tunnel No. 3; on Monday, a week ago, this drift broke into a chamber of high-grade silver and lead ore; at date of report this body had been cut into a distance of 13 feet with no sign of a wall and very little waste in the ore. This is the most favorable looking prospect seen in the district since 1876. The furnace is prevented from starting up only for want of coal; it will not be possible for teams to reach the coal for three weeks yet. At the Fitz mine three men are taking out ore; at the Kentucky mine three men, and at the Modock mine seven men are at work. In each of these mines several more miners could be employed, but there are no idle men at the camp. Smith & Wallace are working the Minnetta mine with five men; they are taking out very rich ore, all of which will be shipped away as soon as roads are open.

Placer.

MAY FLOWER AND LIVE OAK.—*Placer Herald*, March 5: F. Chappellet, superintendent of the May Flower and Live Oak drift mines, near Forest Hill, was in Auburn last Monday. The May Flower is a mine the reputation of which is established. The channel is extensive and rich, and it only remains to run the necessary tunnel to afford drainage and a cheap and convenient method of working, to put the May Flower in a position which will entitle it to rank among the best drift mines in the State. The work of running this tunnel, begun some months ago, as we learn from Mr. Chappellet, is progressing vigorously. At a distance of 495 feet from the mouth of the tunnel a shaft has been sunk 326 feet deep to the tunnel grade, and from the bottom of this shaft the tunnel is being run in both directions, in addition to the work that is proceeding from the mouth, thus driving three faces at one and the same time and enabling the company to run about 500 feet a month instead of about 200 feet a month, as was the case before the shaft was completed. At the top of the shaft are engines for running the hoisting works, the pumps, and machinery for driving fresh air into the works. At present, or up to the last report, the tunnel was in 1850 feet from the mouth, 65 feet west from the shaft, and 60 feet east from the shaft, making in all 1975 feet completed; and leaving about 3000 feet yet to run. With good luck, the channel, already thoroughly prospected by Mr. Chappellet, will be tapped before another fall, and when it is, one of the richest and most extensive mines in the State will be opened for systematic and regular working. As to the Live Oak, Mr. Chappellet thinks it is sure to prove a big mine. The prospect tunnel from Brushy canyon was run most of the way through gravel, but a few weeks ago, when in a distance of 1400 feet, they struck the main channel, which is developing richer and larger than anticipated. Thus far the gravel has averaged about \$3.60 to the ton, and a cut 176

feet crosswise of the channel has not yet reached the rim. In this mine the channel is separate and distinct from the May Flower channel, though the two run parallel and not far apart. The difference is noted in the character of the gravel and the character of the gold. The proof, now considered established, of two distinct channels so close together on the same divide, only goes to show the vast extent of the auriferous deposits of that section, and indicate the importance of the district as a gold-producer, when these channels shall become, by different companies, more thoroughly opened, or, in other words, opened in different places along their course.

Nevada.

PROSPECTING AT MEADOW LAKE.—*Transcript*, March 5: It is stated that as soon as spring opens the company which was last fall experimenting in Meadow Lake district with the electric process of amalgamating, will resume operations with increased vigor. The milling facilities will be enlarged by 20 stamps and other necessary machinery will be added. It is said by those who ought to be informed that the experiments last year were much more successful than was generally believed by the public, the policy of the operators being to make as little stir as possible until they had obtained certain properties there.

THE DRIFT GRAVEL MINES.—*Foothill Tidings*, March 5: The drift gravel mines above here have good lots of gold-bearing gravel on their dumps, and we expect to hear good news from them when they clean up. Just now they cannot wash their gravel because of snow and ice in their ditches. It is reported that the Planet mine dump is showing well and gold is visible to the naked eye on the bedrock. The East New York, Swamp Angel, Enterprise and Golden Bull mines, all drifters in the Planet neighborhood, have rich dumps that are waiting the moving of the waters. The North Star mill is almost ready to start up. It is the finest and most conveniently arranged gold quartz mill in the world.

NEW PROCESS FOR WORKING SANDS.—*Tidings*, March 2: Messrs. Gould & Cobb, late arrivals here, have contracted with the Idaho Mining Co. for the right to "work" the tailings from the Idaho mill. These gentlemen have a new patented process, by which it is claimed that the sand from a mill, after passing through the best concentrators known, can be worked at a profit. A large shed is being erected on Wolf creek, just below the mill and near the railroad crossing, in which the operations will be conducted. Crocker & Richardson are constructing some peculiar boxes to be used in this work.

Plumas.

GENESEE VALLEY.—Cor. *Greenville Bulletin*, March 5: Mining and prospecting are active in this vicinity, while milling is at a standstill, owing to the cold weather of the past week, which froze up the arastras on Ward creek. As old Sol is asserting himself, however, it will be but a short time before the turning out of bullion will again be the order of the day.

Trinity.

QUARTZ.—*Journal*, March 5: From C. C. Shattuck, who was in town this week, we gather the following in regard to his quartz investments in Hay Fork: The Huntington mill recently erected by him has not been running for some time, as the roads have been too soft to haul ore from the mine to the mill. At present he is running a tunnel to tap the vein in the Magdalene at a depth of 300 feet, and, by this means, to ascertain something as to the permanency and value of his property. It is a good working tunnel six feet in height by six feet in width, and was begun from the side of the mountain opposite the ledge. Three shifts are working night and day and much good work is being done. Tunnels are also being run in on the Cyclone and Horse-shoe mines, in both of which Mr. Shattuck is interested. As soon as the roads will admit, the mill will be started to crushing again. The quartz looks well and prospects better, and Mr. S. expresses himself as thoroughly well satisfied with the outlook for his mines, and expects in the spring to add bis quota to the bullion produced in the county.

Shasta.

SILVER BRICKS.—*Shasta Co. Democrat*, March 2: Last Saturday the Iron Mountain Mining Co. sent to Redding to be shipped by Wells, Fargo & Co. to the Argo Smelting Works in Colorado, 15 silver bricks of base bullion, weighing a little less than 1200 pounds, value \$3600. This bullion is the result of the reduction of 110 tons of low-grade ore—which shows that this class of ore averages about \$35 a ton. With their present plant, which is only an experimental one, they are able to work only eight tons a day. The experiment so far has been most satisfactory and will impel the company to put up much larger works this summer. This is signal success, and solid proof of the value of this mine is most gratifying to the mining fraternity generally, and is the forerunner of extensive mining achievements to be made on the Iron Mountain belt. It will also have its effect at Copper City, where there is an unknown quantity of good ore that ought to be reduced by the same process that has proven a success at Iron Mountain.

NOTES.—The Texas and Georgia mine has shut down, owing to the disagreement among the owners. It is rumored that Riley & Co. have been offered \$100,000 for the Central mine recently purchased of Bell, Hopping & Co. It is rumored that Mr. Riley is after the Old Spanish mine in the Old Diggings, owned by Fife & Harrison. Mr. Riley has purchased 250 tons of ore belonging to Bell, Hopping & Co. from the Central mine, paying therefor \$10 per ton. Out of 1600 pounds of rock from the Central mine, Mr. Chick got a little button of \$40. It is claimed that the ore was below the average value. We hear that the Little Maud mine near Iron Mountain, owned by Dow & Haskell, is developing well. Their tunnel is in about 125 feet, with quite bright prospects. Some time back 13 tons of sulphurets yielded \$12 to the ton, while two tons sent to San Francisco gave \$40 to the ton. O. P. Boyd is in charge of the works, and a thorough test is to be made.

OLD DIGGINGS.—*Redding Free Press*, March 5: We paid a visit to the Texas and Georgia mine in the Old Diggings district last week. The Calumet mill is located on the Sacramento, nearly opposite Spring creek. The mill had shut down for Sunday, and we had no opportunity to see the machinery in motion, but obtained a general idea of how the gold is extracted by the Paul patent mill. This mill is capable of crushing 24 tons of rock a day, and the

daily consumption of wood by the furnace is three cords. Several buildings for the use of the men are located near the mill, and the general appearance of the works indicates good management. Getting back to the main road, we soon passed the mill of the Central mine which was in full operation. This mill is also located on the bank of the river. About one o'clock we arrived at our destination. Mr. Day was on hand, and furnishing us with a guide, we climbed the mountain and investigated the mine. We found a succession of seven tunnels from the base of the mountain clear to the top. These tunnels are about 90 feet apart and from 30 to 90 feet long, and most of them show an ore body. The center tunnel is the longest and presents a fine body of ore eight feet across; in fact, it fills the face of the tunnel. This section contains many fine locations, and the natural facilities for working are good. The Texas and Georgia is on a line directly north from Mr. Miller's Gem mine, and the altitude is about 800 or 900 feet above sea level.

Tuolumne.

WILLETTA.—*Tuolumne Independent*, March 5: The stamps are running lively at the Willetta mine, near Jacksonville. Sixty tons of ore are being reduced daily, but it is of low grade, and Superintendent Wagoner proposes to batter up the rock, and move the finer stuff to the mill by water, rejecting the coarse material. There is abundance of water and pressure for the purpose. Work is progressing at the Maryette mine, at Tuttle town. At a depth of 220 feet the vein shows a width of seven feet and the rock shows splendidly.

NEVADA.

Washoe District.

JUSTICE.—*Enterprise*, March 5: From the drift going south on the 350 level, from four to five tons of ore are being extracted daily. This drift is following a streak of ore which was at first only an inch or two in width, which has now expanded to a width of from four to five feet. The ore assays run as high as \$30 to \$40 a ton, and the ore extracted will mill about \$20 a ton. There are now on the dump about 150 tons of this ore, which will presently be sent to the mills. The ore streak improves in going south, and the face of the drift is still some 300 feet from the south line of the mine. A drift has been started south, to find and follow this ore streak, from the bottom of a winze sunk 60 feet below the 350 level.

SAVAGE.—An increased daily output will be forwarded to the mill henceforward. On the 800 level, west crosscut No. 3 has been advanced 19 feet, its total length being now 156 feet. On this and the 600 levels the miners have been partly occupied in easing the drift timbers. The south compartment of the company's shaft has been repaired and is in fine working order to the 800 level.

GOULD AND CURRY.—On the 425 level the southeast drift from the main south drift is still progressing in low-grade quartz. The upraise on this level is in vein material giving low assays. The west crosscut from the upraise on the 300 level is cutting occasional bunches of milling ore. Repairs to the main shaft between the 1000 and 1100 levels are advancing to completion.

CROWN POINT.—Owing to the breaking of the turbine wheel at the Santiago mill, on the Carson river, where the ore was being crushed, no work is now being done in the ore-producing sections of the mine. The wheel is being repaired at the Carson foundry, and will be in order again in three or four days. The extraction of ore will then be resumed with a full force of miners.

POTOSI.—The drift south from the Chollar line on the 250 level is now out 350 feet. The face is in vein material. A number of drifts in the mine are filled with ore that cannot now be milled for lack of milling facilities. As soon as the weather becomes settled the erection of a mill at a point a short distance below the mine will be commenced.

CON. CALIFORNIA AND VIRGINIA.—West crosscut No. 1 on the 1300 level is out 460 feet. On the 1400 west crosscut, No. 3 is out 285 feet. The drifts east and west from No. 2 winze on the 1435 level show a width of over 90 feet of ore. Ore is still being stoped from the bottom of the north winze on the 1500 level.

OPHIR.—The usual progress has been made in east crosscut No. 1, on the 1065 level, without change of material worthy of note. East crosscut No. 1 on the 1300 level is out 344 feet, and the northwest 78 feet. The material encountered in these drifts is a mixture of quartz, clay and porphyry of a favorable appearance.

YELLOW JACKET.—The usual shipments of ore have been made to the Brunswick mill during the week. The greater part of this ore, amounting to over 1100 tons, came from stopes above the 1300. Extensive explorations are being made at several points above the 1300, between the sagebrush and 900 levels, where there is a considerable amount of virgin ground.

IOWA.—The tunnel in the face is in vein matter giving low assays. The south drift from this tunnel is showing a nice stratum of gold-bearing quartz in the roof and face. The surface vein discovered a few days ago has been cut across, showing a width of 12 feet, and giving good assays in gold.

ALPHA AND EXCHEQUER.—These mines are being explored jointly. On the 120 level a west crosscut is being run in vein material which lies in the Alpha ground. A drift north from the old Alpha shaft is penetrating some promising vein material in the Exchequer.

SILVER STAR.—This mine, situated to the west of Silver City, in Devil's Gate district, is being developed under the supervision of Dr. Webber, of this city. In it drifts are being run north and south along the vein on the first or 100 level in very favorable ground.

MEXICAN AND UNION.—The north drift on the 1300 level, which is being run jointly with the Union, is now out 530 feet. It is now in Mexican ground a distance of about 280 feet. The joint Mexican and Ophir east crosscut on this level is now out 210 feet.

OCCIDENTAL.—From 12 to 14 tons of ore are being extracted weekly. The usual progress has been made in the several drifts from the upper and lower tunnels, and in those that are being driven from winzes sunk from the two tunnels.

BEST AND BELCHER.—West crosscut No. 2 on

the 600 level is out a little over 280 feet in a soft formation consisting principally of porphyry. The northeast drift on the 1500 level is out nearly 700 feet in a favorable vein formation.

CHOLLAR.—Repairs to the shaft are progressing favorably. Pending these but little work is being done in the way of exploring the various levels where it is expected that ore will be found.

OVERMAN.—Six carloads a day of fair ore are being taken out from the level in the old Petaluma-street tunnel. This is shipped to the Vivian mill, for reduction.

ALTA.—Still pushing the south drift from the bottom of the winze on the 800 level. The drift is in promising material lying near the wall of the vein.

UTAH.—The north drift on the 472 level is making fair progress and is now out a little over 200 feet. It still shows streaks of quartz.

SIERRA NEVADA.—South lateral drift No. 2 on the 520 level is now out a little over 350 feet. It is passing into vein material that yields low assays.

BALTIMORE.—Good headway is making in the work of reopening the old 225 and 450 levels and in cutting out the new station at the 550 level.

BELCHER.—No work is being done at present in the ore stopes for reasons which will be found under the heading of Crown Point.

SUCCOR.—Retimbering the main shaft, preparatory to vigorous prospecting operations at depth.

BULLION.—Low-grade quartz is still met with in the drift east on the 200 level.

IMPERIAL.—Repairs on the surface and to the shaft are making good headway.

Pioche District.

THE CAMP.—Pioche Record, March 2: Since our last issue the mining outlook for the camp has neither changed for better nor worse. There are two shifts, of two men each, working underground in the old Raymond and Ely, besides two engineers on top; total, six men. The fleaching works are again in operation, running on screenings from No. 3, old Meadow Valley, and also the Burke mine. Mr. W. S. Godbe arrived from Salt Lake a day or two since, and we learn that he is confident of raising \$200,000 for the purpose of prospecting and developing the camp.

Sweetwater District.

BEING DEVELOPED.—Emerald News, March 5: The mines in this district are being developed, and as work progresses the showing for good greatly increases. This district is now attracting the attention of Eastern capitalists, also the Walker Bros., of Salt Lake City. John Sheehan has some valuable mines at Clinton. New York parties are negotiating for their purchase. Judge Curran is employed as watchman at the Kilpatrick mill. It is expected that this mill will be enlarged for the purpose of crushing ore from some of the outside claims of the district. Henry Williams & Co. have let a contract to extend the tunnel run, to cut the ledge on the Thoroughbred mine, which is now in 175 feet; they have 25 feet further to run, when they expect to cut the ledge at a depth of 400 feet. The ledge is very large and contains fine-milling gold ore, averaging from \$20 to \$35 per ton.

Tucacora District.

BELLE ISLE.—Times-Review, March 5: Line crosscut, 150-foot level, extended 7 feet; total length, 86 feet. The rock is very hard, and it is difficult to make any headway. North drift at this point has been advanced 12 feet. Will resume work on the 250-foot level as soon as the track is relaid and other repairs are completed.

NORTH BELLE ISLE.—The rock has become quite hard in the gangway north, from the south end line, 400-foot level, but it still breaks well, and fair progress has been made the past week. There is no improvement in any of the workings.

NAVAJO.—There is no material change in the workings on the 350-foot level. The ore that is being extracted from above the 150-foot level is very low grade, and if it does not improve in a few feet, will stop stoping.

NEVADA QUEEN.—The station at the 200-foot level has been cut out and timbered; shaft is being timbered in the place of the cribbing, which was eroding in. West crosscut, 350-foot level, has been advanced 22 feet; distance from turn-table 95 feet. It has been dry; a slight seepage is showing in the face. North gangway on this level has been stopped until connection with the shaft has been made.

ARIZONA.

SAMPLER.—Prescott Courier, March 4: Mr. Cockburn informs us that he will shortly commence the erection of a house 45x45, near the railroad depot, for the ore-sampling works. The plant will consist of Cornish rollers, Blake crushers, pulverizing mill, assay furnaces, etc., all to cost from \$10,000 to \$20,000.

MORE GOLD.—Mr. J. O. Floyd, of Turkey creek district, was in the city yesterday. He brought golden news. Two miners have been interviewing a ledge in Turkey creek district, about 25 miles south of Prescott. Others had prospected the same ledge and found nothing very rich, but the latest prospectors have discovered a large vein of gold-bearing rock that will pay \$100 to \$500 a ton. This is certain. Mr. Floyd thinks it is the best thing he has seen in the mountains.

COLORADO.

SEVEN-THIRTY MINE.—Georgetown Courier, March 3: The developments in the Seven-Thirty mine are constantly opening up new ore bodies and prove the continuous richness of the veins in all directions. Thirteen headings are being driven, one winze sunk, two raises and one crosscut made. For some time past three separate veins were worked in the lower levels west of the main shaft. These were heading northwest and each produced ore of high grade. More recently the south vein, which has been very productive where worked in the upper levels, has been opened by crosscuts from the 80-foot and 240-foot levels, and practically adds another rich mine to this already rich grist. The crosscut on the 240-foot level is 27 feet long through hard granite, and only reached the vein last week, disclosing in it a nice body of ore. A similar crosscut will now be commenced on the 275-foot level, which will tap the vein at a depth of 500 feet below the surface. The

value of this newly opened vein may be estimated from a shipment made from it a few days ago, which contained 1867 ozs. silver and 1686 lbs. lead, and assayed 124 ozs., 195 ozs., and 460 ozs. silver to the ton, according to class. Thus it will be seen that four distinct veins are being worked in the western ground of this mine, each one heading in a different direction, and each one very profitable. Only one of these was known to be valuable on the surface. This fact should give confidence to our miners in following small leaders of ore which depart from the main vein, or in crosscutting from a vein already followed to others which may be known or believed to exist on either side. It is likely that in this way new veins may be opened up in many of our mines which have already been extensively worked and great value added to them. The Seven-Thirty mine has been worked for 15 years, yet the vein in it which is now producing such rich ore has only been recently known to exist in the lower workings.

IDAHO.

LARGE LEDGE.—Owyhee Avalanche, March 5: We understand that the lower tunnel run to strike the Wilson lode at Wagontown, cut a large ledge, which prospects well. The ore is gold-bearing, and from what we can learn it is the best yet found in that lode. Everybody is looking forward to good times here during the coming summer. Old mines will be worked for what they are worth, new ones will be discovered, and all the mills in the camp will be rattling away on ore from War Eagle, Florida and Wagontown.

OREGON.

LARGE SALE EXPECTED.—Bedrock Democrat, March 2: Upon reliable authority we can say that negotiations are now pending for the sale of the large body of placer claims on Chicken and Connor creeks, owned principally by Weatherby, Moore & Campbell on the part of the Chicken Creek mines, and Campbell, Near & Sisley, of the Connor Creek properties. Chicago people are to be the purchasers, and the consideration \$110,000. The sale, in all probability, will take place as soon as the expected purchasers arrive here, which will be as soon as they are notified of the opening up of spring. At this season of the year it would not be practicable to visit this section in the interest of mining operations, for the reason that it would be impossible to properly examine the properties in question on account of the deep snows completely retarding locomotion in the mountains. The mines in question are very valuable and extensive, and during many years past have yielded thousands upon thousands of dollars of the "shining metal," and yet it can be truly said, they are just beginning to be opened up. Acres of ground still remains untouched by the pick and shovel, and to all indications is richer than the ground already worked.

PINE CREEK.—Bedrock Democrat, March 2: The Colorado Mining Co., of Pine creek, has succeeded in negotiating for 16 mining properties for the sum of \$185,000, and has shipped 200 tons of freight and machinery from Denver via Baker City. The machinery for the Whitman mine, near Baker City, consists of a 20-stamp mill, 200-horse power engine, eight Frue vanners, sawmill outfit, wire-rope tramway, incandescent electric light, and complete sampling machinery. The entire plant is expected to be in operation by the 1st of July next. The population of Cornucopia, the site of the Pine creek mines, is something over 200. The snow there is over ten feet deep, preventing locomotion outside of the town, and almost completely suspending mining operations, except on the properties of some of the leading companies, who were prepared for a hard winter.

NEW MEXICO.

SHIPMENTS.—Socorro Bulletin, March 6: Heavy shipments of mineral are reaching the Graphic smelter. Rev. J. M. Robinson has resumed work on his Iron Mask mine of Garcia canyon. A. R. Bryson is shipping ore from his Magdalena claim, the Quartz Lode, to Socorro. M. Donney, the Apache district miner, had a large quantity of his high-grade ore treated in Socorro this week, and more coming. John A. Miller left on Friday's stage for Alma. He went up to start up the Peacock mill and will give it his personal supervision this summer. W. Trimble, who is working the Juanita by contract, is in the city. He is having some of the high-grade ore recently intersected in that property, sampled at the Billing Works. He reports the Juanita much improved. Capt. J. P. Casey returned from Las Cruces on Tuesday. He reports the Orgao districts as experiencing a mining revival. R. N. Graham of the Gutierrez mine is working that property. A. Donan and Bob Huston are sinking in the Sharon. Marriner's Modoc shaft continues to gain depth steadily. Mr. Graham reports an improved condition of mining throughout the Pueblo district. As we go to press, a strike is reported made by the natives two days ago, west of San Pedro, in this county. The mineral is sulphide of iron, carrying by determination 18 in gold and \$2.60 in silver. The gangue is quartz and the vein measures 28 inches in width. The walls are limestone and syenite. J. W. Howard, a colored prospector, has made the discovery of a five-foot vein of quartz which yields \$20 in gold and some silver. He made the find in the Lucera mountains, situated in this county. This range has as yet not attracted any attention from prospectors. Five hundred pounds of plumbago from a new discovery in this county were sent East for examination on Monday last. This graphite was very free from silica or other impurities, and is higher in carbon than any of that mineral yet discovered in the southwest. If the first shipment meets the approbation of eastern connoisseurs of the article, it will be followed by earload lots.

MONTANA.

ANACONDA.—Review, March 3: Superintendent Dawson came down from Butte Sunday morning with two engines and a large force of men, and came up on the branch to help clear the track. The weather in the meantime had turned into a sure-enough Chinook and the snow packed and settled considerably, so that the snow when once shoveled out would not drift back again. The work of shoveling was continued until the Anaconda train was clear

of the main track and the engines could be turned around, when a double-header with a small plow was turned loose, which soon cleared the track. The work of bringing in the delayed ore, coal and merchandise was commenced immediately, and by noon Monday 60 cars of ore had been brought in. The Chinook has done more for us than 10,000 men could do, and it has removed all fear as to having another blockade unless we have another fall of snow. The only thing to fear now is a washout, but we do not anticipate any great trouble on that account, as the snow will not go off too suddenly unless the nights should be much warmer than they are.

PROSPECTORS.—Anaconda Review, March 3: "It is an ill wind that blows no good to some one." This old saying has, without doubt, been proven by the past hard winter; while it has been the means of serious losses to the stock interests of Montana, it has been of benefit to the mining interest. The deep snow and cold weather has compelled the prospector to camp right where the cold weather overtook him, and not being able to hunt or follow up surface indications, he has mechanically worked ahead, in many instances hoping against his own judgment. This alone has been the means of developing three prospects in the immediate vicinity of Anaconda, which are now known to be mines of considerable value. One of these, the Boomerang, owned by Dresel & Carty, located just north of the Blue-eyed Nellie, has developed into a very valuable property. The fortunate owners have been developing all winter, and will be ready to ship their ore, which is very much the same grade as the Blue-eyed Nellie, as soon as the road will permit. There are three other claims in this immediate locality that are equally promising, and we are confident that early spring will witness one of the greatest mining booms ever known in this locality. An old miner stated to a representative of this paper that he believed the mining belt from Anaconda to Phillipsburg to be unsurpassed in the world. A new strike has been made in the Blue-eyed Nellie which is the richest ever found in that wonderful mine, and has increased the value at least three-fold. The owners are quite jubilant over their good fortune.

UTAH.

REVIEW.—Salt Lake Tribune, March 4: The week has been a dull one in mining circles; no special event has broken the monotony. The two-months' receipts of bullion for the year 1886 have been as follows: January, \$658,148.44; February, \$357,815.28; total, \$1,015,963.72. This excludes all receipts of ore. The Ontario output for the two months past was as follows: January, fine ounces, 104,446.49; ore sales, \$60,740.99; February, 96,328.29; ore sales, \$45,718.77; totals, fine ounces, 200,774.78; ore sales, \$106,459.76. From this the usual monthly dividends of \$75,000 each have been paid, or \$150,000 for the two months. The Daly product for the two months was as follows: January, fine ounces, 59,624.19; ore sales, \$17,518.61; February, fine ounces, 47,092.63; ore sales, \$4,505.63; totals, fine ounces, 106,716.82; ore sales, \$22,024.24. From this a dividend of \$75,000, or 50 cents a share, was paid the 15th of February. But no more dividends will be paid until the new machinery is all put in. The Daly (Marsac) mill was closed down for repairs from the 1st to the 7th of February, inclusive. The receipts in this city, for the week ending the 2d instant, inclusive, were \$96,358.04 in bullion and \$74,932.79 in ore, a total of \$171,290.83. For the previous week the receipts were \$130,868.41, of which \$100,620.74 was bullion, and \$30,247.67 was ore. The output of the Ontario for the week was 23,957.21 fine ounces, and ore sales to the value of \$10,834.10, a total of \$34,791.21. The Daly product for the week was 13 bars of bullion, 18,244.61 fine ounces; no ore sales. The receipts of fine bars for the week amounted to \$45,718.37; of base bullion, \$15,800. The Hanauer smelter produced bullion to the value of \$14,045, and matte valued at \$5,400, a total of \$19,445. The Horn Silver has had a bad week on paper. At the mine, very limited operations are going on under a thick veil of secrecy.

PARK NOTES.—Record, March 2: The Anchor is now well supplied with all the requisite machinery for developing that more than promising property for some time to come. Sinking is still going ahead as rapidly as possible with the usual large force. With the excellent pumping facilities the water in the mine is well controlled. The Boss property, under the management of E. P. Perry, is attaining good results. It is understood that daily dividends will not be resumed until after the new machinery gets into working order.

THE CRESCENT PREPARATIONS.—Among other companies making ready for new machinery, the Crescent's preliminaries are most noticeable. By next May, the winze will have been far enough down and other preliminaries ready to receive and put in operation the following machinery, which embraces one of the largest plants ever produced in Utah, aggregating in weight more than 100 tons, viz.: One No. 10 Burleigh air compressor, one pair 100-horse power double-drum hoisting engines, one pair of 54x10 steel boilers, two 48x6 air receivers, a No. 7 Lowell filter-heater and condenser, 1200 feet of wire rope, 2200 feet seven-inch air pipe, etc. After this plant gets in working order, the mine can be advantageously worked and the high-grade ore economically extracted. Large shipments of first-class ore and regular dividends will surely follow.

CAMP CROSSCUTS.—Before long Mr. Pierson will have the mammoth Pennsylvania incorporation on foot and working on the valuable ground of Pioneer ridge. There is little room for doubt that the directors of the Park Mining Company, which owns the valuable, paying group of claims at the head of Thayne's canyon, will order operations to be resumed on a large scale as soon as the weather permits. This means heavy shipments of fine, high-grade ore, of which it is known they have a strong vein. Wm. Dix is making preparations to extensively work his coal property, which is located this side of Wanship, less than 12 miles from the Park. Thursday the Crescent concentrator was fired up to make a run on a sample lot of ore.

ORE AND BULLION SHIPMENTS.—For the 10 days just ended, the Crescent shipped 337,600 pounds of first-class ore. During the week, the MacIntosh sampler received 535,470 pounds of Ontario and 124,860 pounds of Daly ore; total, 660,330 pounds. Last Monday seven bars of Daly bullion, containing 7846 fine ounces of silver, were shipped from the Marsac mill.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DAWNEY & Co.'s Patent Office Library, 262 Market St., S. F.

FOR WEEK ENDING MARCH 1, 1887.

358,589.—WASHBOILER—G. Bergenheim, S. F.
358,597.—GRAPE AND APPLE CRUSHER—A. David, S. F.
358,608.—BALE TIE—A. S. Hallidie, S. F.
358,618.—HOSE PATCH—W. H. Loomis, Alameda, Cal.
358,686.—DREDGER—W. H. Milliken, S. F.
358,630.—HEADER—C. M. & W. L. Slayback, Folsom, Cal.
358,502.—ROOFING MATERIAL—G. W. Swan, S. F.
358,584.—SUBWAY FOR CABLE RAILROAD—Vogel & Whelan, S. F.

Notes.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco.

PROCTOR WOOLEN CO. March 8. Location, Alameda Co. Directors—Geo. H. Proctor, J. F. Eastman, A. C. Henry, G. F. Crist and O. C. Kirk.

GUALALA M. CO. March 7. Location, Mendocino Co. Capital stock, \$100,000. Directors—J. W. Oates, John Field, R. H. Warfield, H. W. Barmham and J. C. Cox.

MEXICAN R. R. CO. March 8. Object, to construct a railroad from the City of Mexico through Cuernavaca to Puente de Ixtla, in the State of Morelos, a distance of 85 miles. Directors—Thos. Bell, Geo. Hearst, Louis Sloss, John Rosenfeldt, Louis A. Garnett, Henry S. Bacon and J. Augusto Verger. Capital stock, \$3,000,000 in 30,000 shares.

AERIAL STEAM NAVIGATION CO. March 9. Object, the manufacture of steam air-ships for navigating the air; has been organized, and filed articles of incorporation. Capital stock, \$100,000. Directors—J. N. Russell, A. T. Knorr, M. M. Patterson, C. M. Seeley and Robert Brown.

OREGON CASKET CO. March 9. Object, manufacturing coffins, caskets, hearses, and all necessary paraphernalia for the conducting of funerals. Capital stock, \$50,000. Directors—James P. Pierce, John P. Finley, William P. Morgan, C. H. Morgan and George P. Thurston.

WHITNEY STANDARD AND OAKLAND TRANSFER CO. March 9. Object, to do a general express, transfer, and agency and commission business in the State of California. Capital stock, \$100,000 in 2000 shares. Directors—M. A. Cahn, A. J. McGovern, Oscar Fitch, A. M. Babbitt, A. M. Salinger, R. S. Farrelly and M. J. Miller.

Mining Share Market.

Mining stocks have been rather active this week. The fact that assessments are rather plentiful just now does not seem to affect the market much. Notwithstanding the fact that last month was a short one, and that the freezing of the Carsoo river reduced the amount of ore milled about 20 per cent, the Consolidated California and Virginia shipped \$270,592 in bullion. The milling facilities of the Comstock mines will be all right shortly, and there will then be a larger output of ore. In a few weeks the whole line of the Comstock, from the Utah to below Silver City, will be more active. A new mill is to be built in Virginia, below the line of the Comstock, where will be worked the ore developed on the Potosi.

Most of the mines dealt in at the stock boards show cash on hand on the 1st of the month, very few showing an indebtedness.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Granite Mountain, March 4, \$67,715; Hanauer, 1, \$4025; Bannock, 1, \$1800; Richmond Con., 3, \$18,884; Silver Reef District (for February), \$18,772; Hanauer, 3, \$8900; Alice, 3, \$20,800; Moulton, 3, \$11,114; Alice, 5, \$10,702; Hanauer, 5, \$8374; Bluebird, 4, \$35,568; Hanauer, 6, \$2690; Con. California and Virginia, 8, \$75,271; total from this mine for February, \$270,592. Wells, Fargo & Co., of Salt Lake, received in bullion last week \$98,425; McCornick & Co., \$51,755; T. R. Jones & Co., \$7525, and Union bank, \$13,594.

Complimentary Samples.

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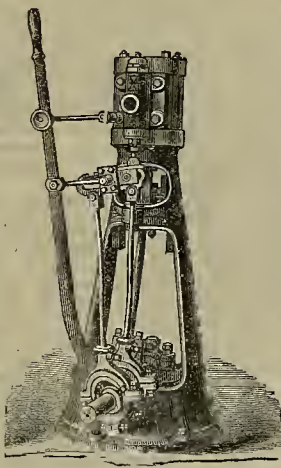
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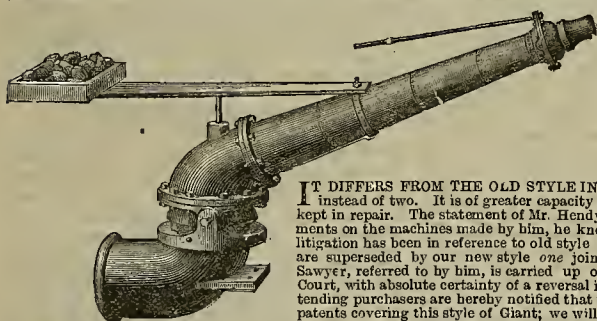
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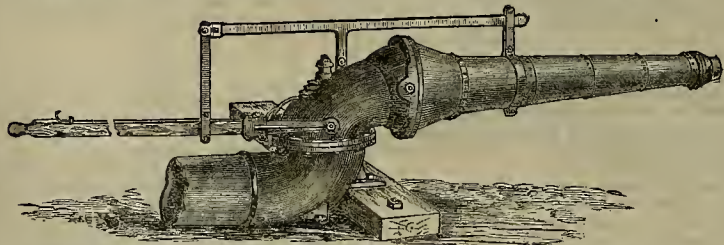
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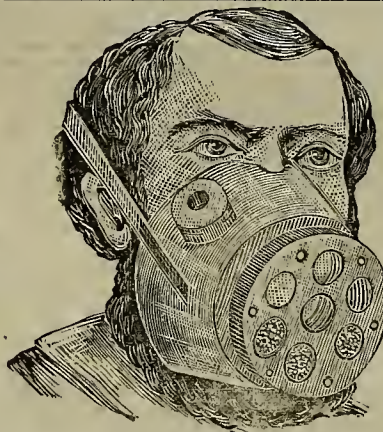
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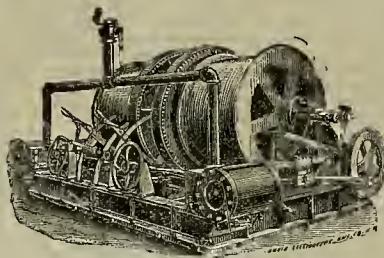
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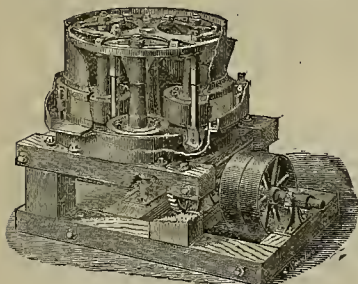
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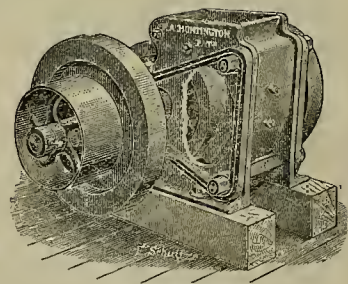
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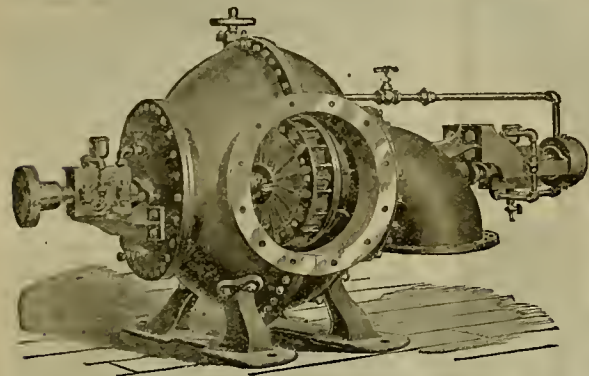
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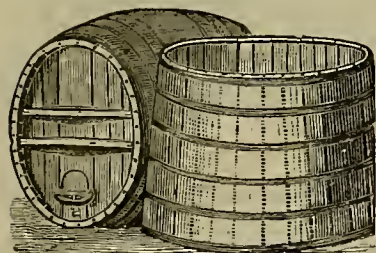
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Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,

Under Chamberlain Patent.

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GISTS' GLASSWARE AND SUNDRIES, ETC.

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Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

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ESTABLISHED 1869

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

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Corner of Leidesdorff Street, - SAN FRANCISCO

Gres Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Gres, Minerals and Waters.

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C. H. AARON,

ASSAYER AND METALLURGIST,

NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

Aluminium, "the Metal of the Future."

The Only Treatise in the English Language.

JUST READY.

Aluminium: Its History, Occurrence, Properties, Metallurgy and Applications, including its Alloys. By Joseph W. Richards, A. C., Chemist and Practical Metallurgist, Member of the Deutscher Chemischer Gesellschaft. Illustrated by 16 engravings. 12mo. 346 pages. Price \$2.50, free of postage to any address in the world.

CONTENTS: Part I. History of Aluminium. II. Occurrence of Aluminium in Nature. III. Physical Properties of Aluminium. IV. Chemical Properties of Aluminium. V. Metallurgy of Aluminium. VI. The Manufacture of Sodium. VII. Manufacture of Alumina. VIII. Manufacture of Double Chloride of Aluminium and Sodium. IX. Manufacture of Aluminium at Salindres (Card). X. Reduction of Aluminium by other Reducing Agents than Sodium. XI. Working of Aluminium. XII. Alloys of Aluminium. Appendix. Addenda. Index.

A circular showing the full table of contents of this volume will be sent free of postage to any one in part of the world who will furnish us with his address.

HENRY CAREY BAIRD & CO.,

Industrial Publishers, Booksellers and Importers, 810 Walnut St., Philadelphia, Pa., U. S. A.

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MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Andes S M Co.	Nevada.	25, Jan 24, Mar 3.	Mar 23, B. Borris.	309 Montgomery St	
Alta S M Co.	Nevada.	50, Feb 3, Mar 10.	Apr 5, W. H. Watson.	302 Montgomery St	
Bodie Con M Co.	California.	50, Jan 28, Mar 28.	Mar 28, C. W. Sessions.	309 Montgomery St	
Bullion M Co.	Nevada.	40, Jan 22, Mar 1.	Mar 1, R. R. Grayson.	327 Pine St	
Benton Con M Co.	Nevada.	25, Jan 28, Mar 21.	Mar 21, W. H. Watson.	302 Montgomery St	
Best & Belcher M Co.	Nevada.	50, Mar 5, Apr 15.	May 5, L. Osborn.	309 Montgomery St	
California M Co.	Nevada.	42, Jan 15, Mar 1.	Mar 1, A. S. Goolbs.	414 California St	
Camp Creek Placer M Co.	California.	10, Jan 20, Mar 10.	Apr 14, C. W. Miller.	376 Pine St	
Dolores Con M Co.	Nevada.	40, Mar 2, Apr 11.	Apr 29, R. N. Van Brunt.	318 Pine St	
Four Hills Mine.	California.	1, 25, Jan 22, Feb 28.	Mar 21, F. S. Moody.	328 Montgomery St	
Golden Fleece Gravel M Co.	California.	8, 10, 09, Jan 27, Mar 8.	Mar 28, W. J. Gleason.	310 Phelan Block	
Gover Improvement Co.	California.	2, 10, 09, Feb 28, Mar 5.	Apr 26, R. N. Van Brunt.	318 Pine St	
Gould & Curry S M Co.	Nevada.	50, Mar 3, Apr 11.	May 4, A. K. Durbin.	309 Montgomery St	
Hubert Concentrator Co.	California.	1, 10, Jan 17, Feb 10.	Mar 14, M. Livingston.	230 Montgomery St	
Hazard Gravel M Co.	California.	1, 03, Jan 26, Mar 1.	Mar 23, J. T. McGeoghegan.	323 Pine St	
Louie Jack M Co.	California.	1, 06, Jan 27, Mar 7.	Mar 22, J. M. Huntington.	309 California St	
Lady Washington M Co.	Nevada.	2, 10, Jan 28, Mar 7.	Mar 28, W. H. Watson.	302 Montgomery St	
Minhattan S M Co.	Nevada.	2, 00, Feb 3, Mar 10.	Mar 22, J. Crockett.	327 Pine St	
Mayflower G M Co.	California.	24, 25, Jan 19, Feb 28.	Mar 18, J. Meiz.	328 Montgomery St	
N Banner Con T Co.	California.	16, 08, Jan 1, Feb 5.	Feb 26, T. J. Mitchell.	Grass Valley	
Nevada S M Co.	Nevada.	57, 30, Jan 21, Feb 23.	Mar 18, G. D. Edwards.	414 California St	
Occidental M Co.	Nevada.	8, 40, Feb 3, Mar 10.	Mar 21, A. K. Durbin.	309 Montgomery St	
Phelps Manufacturing Co.	California.	1, 50, Feb 12, Mar 21.	Apr 5, W. H. Phelps.	17 Drumm St	
Phoenix Con M Co.	California.	2, 143, Jan 26, Mar 5.	Mar 28, C. Collichon.	516 California St	
Spring Valley M Co.	California.	2, 34, Jan 22, Mar 5.	Apr 4, H. Pichor.	320 Sansome St	
Sierra Iron Co.	California.	6, 25, Feb 17, Mar 30.	Apr 23, H. P. Bush.	431 California St	

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Belmont M Co.	Nevada.	J. W. Pew.	318 Pine St.	Special.	Mar 25
Con Washoe M Co.	Nevada.	P. MacEwen.	314 Montgomery St.	Annual.	Mar 24
Chollar M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	Annual.	Mar 16

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50.	Mar 4
Martha White M Co.	Nevada.	J. J. Scoville.	309 Montgomery St.	25.	Dec 20
Paradise Valley M Co.	Nevada.	W. L. Oliver.	309 Montgomery St.	10.	Nov 30
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Mar 15

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 17.	WEEK ENDING Feb. 24.	WEEK ENDING Mar. 3.	WEEK ENDING Mar. 10.
Alpha.	2.50	3.00	3.10	3.70
Alta.	1.25	1.35	1.30	1.60
Andes.	.80	.90	.65	1.00
Argentine.	.15	.15	.15	.15
Belcher.	2.20	3.40	2.50	3.40
Bodie.	.70	.70	.70	.70
Bodie & Belcher.	.91	1.04	.72	1.04
Bullion.	2.30	2.45	1.90	2.35
Baltimore.	.75	.80	.75	1.00
Bodie.	.25	.30	.35	.30
Bodie Con.	1.90	1.95	2.00	2.50
Benton.	.30	.35	.50	.30
Bodie Tunnel.	1.00	1.00	1.50	1.15
Bulwer.	1.00	1.00	1.50	1.15
Con. Va. & Cal.	1.25	2.10	1.50	1.25
Challenge.	1.35	2.00	2.00	3.25
Champion.	7.00	8.00	6.50	8.00
Chollar.	6.50	7.50	6.50	8.00
Con. Imperial.	4.00	5.00	3.00	3.00
Caledonia.	.40	.55	.50	.35
Con. Pacific.	.30	.30	.35	.30
Crown Point.	8.00	4.10	3.50	3.50
Crocker.	1.00	1.00	1.00	1.00
Central.	.50	.55	.55	.60
Dudley.	1.00	.25	.25	.25
East B. & B.	1.00	1.00	1.30	1.35
Eureka Con.	6.75	6.75	6.75	6.75
Essex.	1.40	1.50	1.40	1.50
Gould & Curry.	4.55	5.10	5.10	5.10
Hale & Norcross.	5.25	6.00	5.25	6.00
Holmes.	3.25	4.00	2.95	3.00
Independence.	.55	1.20	.65	1.00
Iowa.	.35	.65	.55	.70
Julia.	1.20	1.55	1.35	1.70
Justice.	1.50	1.55	1.50	1.50
Lady Wash.	.20	.20	.25	.25
Martin White.	2.20	2.50	2.60	3.00
Mono.	6.25	7.50	5.50	6.00
Mt. Diablo.	4.00	4.00	4.00	4.00
Northern Belle.	.50	.50	1.00	.50
Navajo.	4.00	4.50	4.40	4.70
North Belle Isle.	1.30	1.50	1.55	1.75
Niagara.	.40	.40	.40	.40
Nev. Queen.	1.10	1.30	1.50	1.70
North G. & E.	.75	.75	.75	.75
Occidental.	.11	.12	.12	.12
Opbir.	1.10	1.30	1.50	1.70
Overman.	.75	.75	.75	.75
Potosi.	.35	.40	.40	.40
Perth.	.35	.40	.40	.40
Peer.	.10	.10	.10	.10
P. Sheridan.	5.50	6.00	5.00	6.25
Silver Star.	4.95	5.10	5.10	5.10
Savage.	.30	.30	.30	.30
Seg. Belcher.	4.95	5.10	5.10	5.10
Sierra Nevada.	.30	.30	.30	.30
Silver Hill.	.30	.30	.30	.30
Silver King.	.30	.30	.30	.30
Scorpion.	.30	.30	.30	.30
Syndicate.	.30	.30	.30	.30
Union Con.	4.20	4.50	4.35	4.50
Utah.	6.90	7.00	6.50	7.25
Yellow Jacket.	4.60	5.10	4.75	5.40

Sales at San Francisco Stock Exchange.

THURSDAY Mar. 10, 1887.	200 Independence.	20c	
510 Andes.	1.35@1.40	550 Julia.	60c
2320 Alta.	1.65	200 Justice.	1.50@1.70
100 Argenta.	.45	200 Kentucky.	.80
945 B. & Belcher.	2.20	250 Lady Wash.	.55c
2250 Bullion.	2.60@2.80	200 Mexican.	.7
100 Bodie Con.	3.00	400 Mt. Cory.	.75@.77
870 Belcher.	3.75@3.80	500 Mono.	.70
600 Baltimore.	1.21.05	100 Navajo.	.90c
300 Belle Isle.	.25c	100 Nev. Queen.	1.15
750 Benton Con.	.75	995 Opbir.	.11@.12
200 Bulwer.	1.30	400 Overman.	.2@.21
250 Chollar.	.84@.85	200 Occidental.	.40
400 Con Va. & Cal.	1.9@1.94	400 P. Sheridan.	.10c
900 Crown Point.	4.80@4.90	655 Potosi.	.91@.93
550 Crocker.	1.05	101 Peer.	.45c
300 Con. Imperial.	.31@.33	110 Savage.	.65@.66
600 Central.	.45	800 Scorpion.	.45@.46
150 Challenge.	.55@.56	900 Sierra Nevada.	.55@.56
1080 Exchequer.	2.50@2.60	250 Silver Hill.	.40@.45c
150 East B. & B.	1.50	400 Syndicate.	.25c
530 Gould & Curry.	5.10@5.20	700 Union Con.	4.30@4.40
580 Hale & Nor.	5.10@5.20	425 Utah.	1.80
		135 Yellow Jacket.	.51@.52

New York Metal Market.

Telegraphic advices dated March 9th give the following New York prices:
 BAR SILVER—\$1.01 1/2 per oz.
 BORAX—\$1.06 1/2.
 COPPER-LAKE—\$1.04 1/2.
 IRON—No. 1, \$22.00@22.50.
 LEAD—\$4.75.
 QUICKSILVER—\$3.50@4.
 The following is the latest by mail from the "New York Metal Exchange Market Report":
 COPPER—Dull, spot closing at \$10.60@—, Transferable Notices (Lake) issued at \$10.75@—, Transferable Notices (Chili Bars) issued at \$39.10@. 6d.
 LEAD—Steady at \$4.33@4.50 spot. Transferable Notices issued at \$4.45.
 TIN—Firm at \$22.60@22.75. Transferable notices issued at \$22.65.
 Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Aus-

ASSESSMENT NOTICE.

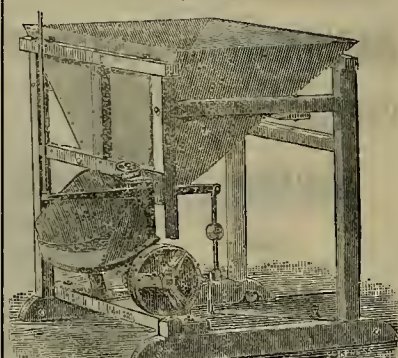
The Phelps Manufacturing Company.—Location of principal place of business, San Francisco, California. Location of works, San Francisco, Cal.
 NOTICE is hereby given, that at a meeting of the Board of Trustees, held on the 12th day of February, 1887, an assessment (No. 1) of Five Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, 17 Drumm street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 21st day of March, 1887, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Tuesday, the 5th day of April, 1887, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Trustees.
 W. H. PHELPS, Secretary.
 OFFICE—17 Drumm St., San Francisco, Cal.

ASSESSMENT NOTICE.

Gover Improvement Company.—Location of principal place of business, San Francisco, California. Location of works, Amador county, California.
 NOTICE is hereby given, that at a meeting of the Board of Directors, held on 28th day of February, 1887, an assessment (No. 2) of ten dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, 318 Pine street, room 6, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 5th day of April, 1887, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Tuesday, the 26th day of April, 1887, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
 R. N. VAN BRUNT, Secretary.
 OFFICE—318 Pine St., San Francisco, Cal.

"CHALLENGE" Ore-Feeders

Patented March 17, 1874; December 28, 1880;
 July 21, 1885.



Over 1600 of these Machines have been put in practical use, giving perfect satisfaction.

It has long since been fully demonstrated that the principle upon which a thoroughly practical Ore-Feeder must be constructed is that of a CARREER, and not that of a percussion shaking table. Uniform and accurate feeding is not possible upon the latter plan. The ore must be evenly carried, upon a steadily advancing plane or table, to the line of discharge, and there simply dropped. Jerky, spasmodic or roller contrivances will not answer the purpose for wet, sticky ores.
 These Ore-Feeders are adopted by all of the most prominent Quartz Mills in the United States, and we have shipped a large number to the best Mills in the Mining Districts of Mexico, Australia and South America. In this connection we deem it proper to call attention to the fact that a form of Feeder known as the "Templeton Roller" Feeder is being manufactured in this city, and as the manufacturers of the same claim that they are superior to any other style, and cite those in operation at the "Bunker Hill" Mill in Amador county, we contradict the statement, and in substantiation submit copies of letters, which speak for themselves:

BUNKER HILL GOLD MINING CO.,
 AMADOR CITY, CAL., July 12, 1886.
 To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: We have used the "Challenge" and "Roller" or "Templeton" Ore-Feeders in our mill for the past three years, and I am free to say that I consider the "Challenge" far superior to the "Roller" Feeder, in that most important of all things in a quartz mill, namely, the regular feeding of ores to the batteries. If the "Roller" Feeder is regulated to feed finely pulverized ore, the coarser ore will choke the outlet of the battery, and no ore can reach the batteries. If, on the other hand, it is regulated to feed coarse ore, then the fine ore when it comes will sluice right through and fill the batteries. The "Roller" Feeder requires constant attention. Yours truly,
 (Signed) N. W. CROCKER, Supt.

SAN FRANCISCO, Jan. 3, 1887.
 To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: In reply to yours concerning "Roller" or "Templeton" Ore-Feeders, built by the Golden State and Miners' Iron Works, of this city, for more than a year past, in the Bollo Gopher Mill, in El Dorado county, this State, and being acquainted with the superior principles of construction and the operations of the "Challenge" Feeder built by yourselves, I unhesitatingly indorse the statements made by Mr. N. W. Crocker, Superintendent of the "Bunker Hill" Gold Mining Company, under date of July 12, 1886, as to the irregularity of the feed of the "Roller" or "Templeton" Feeders under the conditions of use which he names, and I am very truly yours,
 (Signed) W. G. ROBERTS,
 Of Greenwood, El Dorado Co., Cal.
 TAYLOR MINE, NEAR GREENWOOD,
 EL DORADO CO., Jan. 17, 1887.

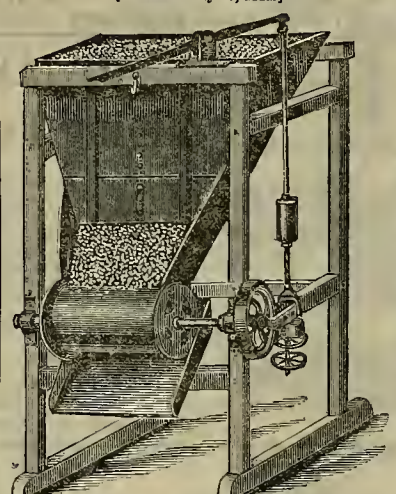
Joshua Hendy Machine Works, No. 51 Fremont St., San Francisco—GENTLEMEN: In reply to yours concerning Ore-Feeders I have to say that the "Challenge" is the best in use. I have placed the following in mills of this county, viz: Four in the Pacific Mill at Placerville, two in a mill at Pleasant Valley, two in the Texas Mill to feed gravel, two in the Water Co's Mill, and they all gave good satisfaction. I have also placed the following "Roller" or "Templeton" Feeders, viz: Four in the Bollo Gopher Mill, near Greenwood; one in the Boulder Mill, on Weber Creek, and the proprietors of those mills have complained of their not working well. I intend putting two "Challenge" Feeders in the Taylor Mill right away. Yours truly,
 (Signed) D. C. WICKHAM.
 OFFICE OF THE
 SOUTH SPRING HILL GOLD MINING CO.,
 AMADOR CITY, CAL., Feb. 3, 1887.

Joshua Hendy Machine Works, No. 51 Fremont St., San Francisco—GENTLEMEN: Having used four (4) of the "Challenge" Ore-Feeders in the Mill of the above-named company, under my supervision, during the last year, and having frequently seen and carefully observed the operation of the "Roller" Feeders in the Mill of the "Bunker Hill" Gold Mining Company, I can, and do will, indorse the statement made by the Superintendent of that company, bearing date July 12, 1886, as to the comparative merits of the two forms of "Challenge" and "Roller" Feeders, and I am pleased to be able to state, from my long practical experience, that the "Challenge" is the most economical, durable and best form of Feeder yet devised, and I would not use, nor would I advise the use of the "Roller" Feeders under any circumstances at whatever price they might be quoted.
 Two "Challenge" Feeders were originally placed in the Ten (10) Stamp Gold Mill of the "South Spring Hill" Gold Mining Company, and their operation was so completely satisfactory that when the mill was increased to its present capacity of Thirty (30) Stamps four (4) more were added and the six (6) are giving perfect satisfaction. It affords me pleasure to bear this testimony to the excellence of the "Challenge" Feeders, and I am, very truly yours,
 (Signed) J. R. TRELOAR,
 Superintendent South Spring Hill Gold Mining Co.

We are prepared to furnish either the
 "Challenge," "Stanford," "Tullock," or
 "Roller" Feeders,
 And will furnish descriptive Catalogues and quote prices upon application to
JOSHUA HENDY MACHINE WORKS,
 89 to 51 Fremont St., San Francisco.

THE ROLLER ORE FEEDER

(Patented May 28, 1882.)



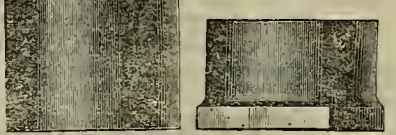
This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.
 In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

Golden State and Miners' Iron Works.
 Sole Manufacturers,
 227 First Street, San Francisco, Cal.

H. D. MORRIS,
 22 Fremont Street, San Francisco, Cal.

Manufacturers' and Purchasing Agent.
 Special attention given to purchase of
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COLLEGE,
 24 Post St. S. F.
 Send for Circular.

San Francisco Metal Market.

THURSDAY, Mar. 10, 1887.	THURSDAY, Mar. 10, 1887.
ANTIMONY—French Star.	94 @
BORAX—San Bernardino.	1 @ 8
Armago.	1 @ 8
IRON—Glengarnockton.	23 @ 20
Edlington, ton.	24 @ 22
American Safe, No. 1, ton.	24 @ 24
Oregon Pig, ton.	21 @ 20
Clay Lane White.	21 @ 20
Shotts, No. 1.	23 @ 20
Bolt.	25 @
Sheathing.	18 @ 23
Ingot.	12 @ 13
LEAD—Pig.	4 7/8 @
Bar.	5 25 @ 5 50
Sheet.	5 25 @
Shot, discount 10% on 500 bag.	1 65 @
Buck, bag.	1 85 @
Chilled, do.	2 05 @
Quickcast—By the flask.	38 @ 39
Flasks, new.	1 05 @
Flasks, old.	85 @
STEEL—English, lb.	14 @ 15
Black Diamond, ordinary sizes.	10 @ 5
Pow.	4 @ 6
Machine.	10 @
Sanderson Bros.	5 @ 6
ZINC—German.	8 @ 9
Sheet, 7x3 ft, 7 to 10 lb, less the cask.	64 @
TRIPPLE—Coke.	4 90 @ 5 00
Charcoal.	6 25 @ 6 50

Our New Street No. 220.

Upon first occupying our present location on Market street, we found our premises numbered 252, and the next door east of us (toward the water front) is numbered 218. This discrepancy of numbers has confused people coming up to our office from the ferry-landing. One-fourth of a block above us on Market street, appear the numbers 400 and upward, there being no numbers used from Nos. 300 to 400. Parties coming down the street and seeing the numbers 400 and upward, knowing our number to be 252, have naturally concluded that they had a block or two to walk before reaching our place, and have frequently passed by our office to suddenly find themselves abreast of numbers 200 and odd, and have to retrace their steps. Much confusion has occurred in this manner. For this reason we have adopted No. 220 [Market street], hoping in a measure to avoid the difficulty, and trusting that some day the city authorities will take the matter in hand, and see that Market street, in our locality, is properly numbered.

LIBERAL RELIGIOUS LITERATURE.—Views, Opinions, and Sentiments of Eminent Writers on Religion and its Relation to Man and Society, sent free. Address,
 MISS HARRIET KELSEY, Sec'y,
 Unitarian Church, San Francisco.
 Correspondence invited.



THE Sign of the Arkansas Cough Syrup is looking you all square in the face.
 Do you want a sure, safe and reliable Cough Syrup? Are you troubled with a Cough, Cold, Bronchitis or Lung Complaint? Do your Babies keep you awake all night with Hacking Coughs, Colds in the Head, etc. Do you want something emergencies? We answer to all: "Go to your Druggist and get a Bottle of the Arkansas Cough Syrup, and be troubled no more." Price, 50 cents per Bottle!
 For Sale by all Druggists.

SILVER-PLATED AMALGAMATING PLATES

FOR SAVING GOLD

—IN—
QUARTZ AND PLACER MINING.

The Most Extensive and Only Successful Manufacturer of these Plates on the Pacific Coast.

OVER 3000 ORDERS FILLED:

Only Refined Silver and Lake Superior Copper used.

WEIGHT GUARANTEED!

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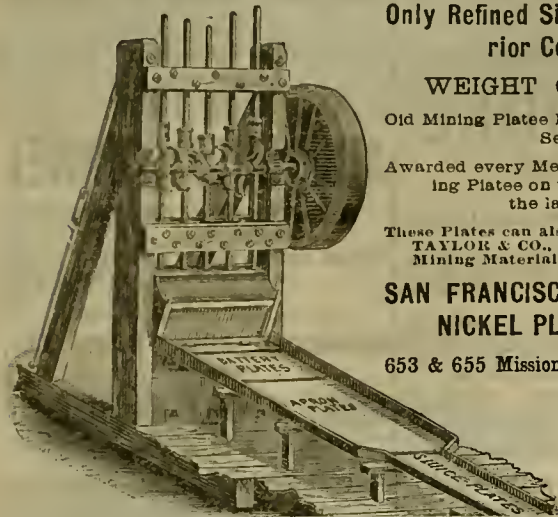
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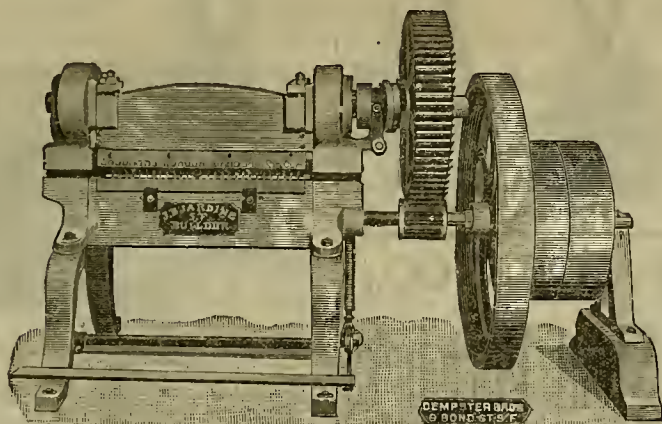
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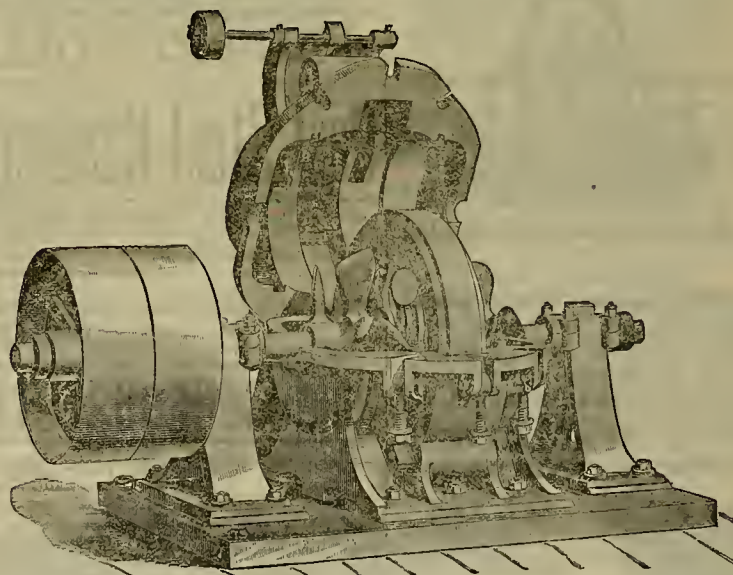
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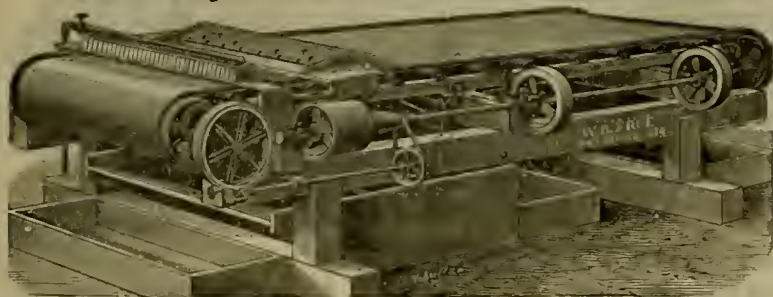
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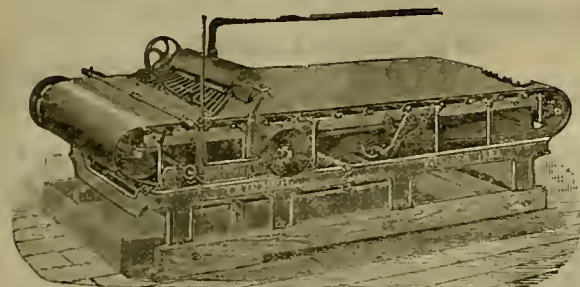
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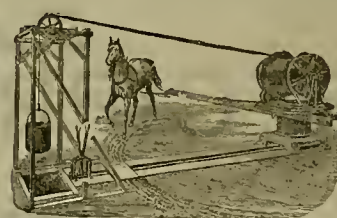
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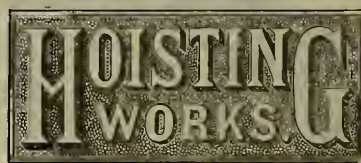
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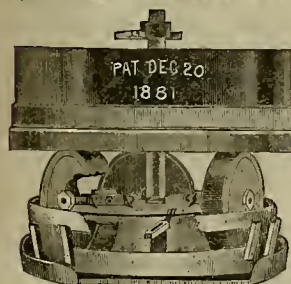
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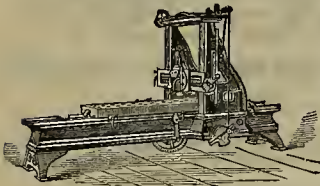
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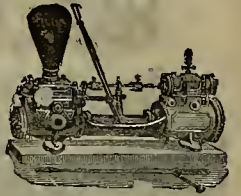


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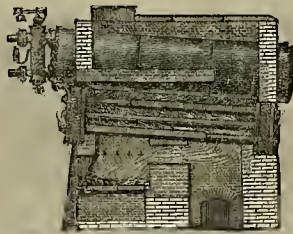
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, MARCH 19, 1887.

VOLUME LIV
Number 12.

The Hazelton Boiler.

While the developments, as applied to the application and use of steam in the various departments of engineering, have in the last half century been marvelous, it must be admitted that but little advance has been made in the matter of its generation. Better material and workmanship have given increased service and security, but the old form of tubular boiler has always stood as about the best type for reliable and reasonably economic service.

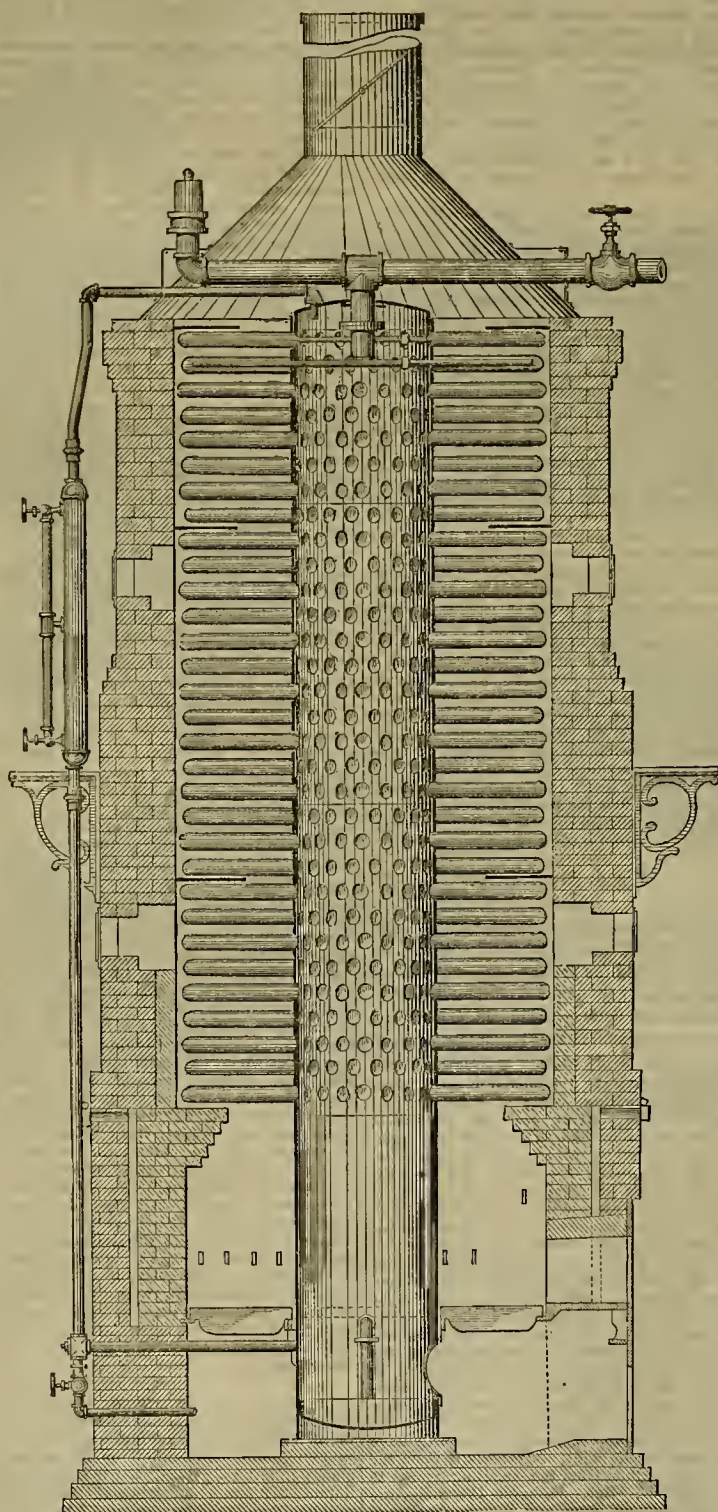
Many different forms of sectional and multi-tubular boilers have of late claimed the attention of steam-users, on the ground of safety and economy, and while having some advantages in these respects, they are more than counterbalanced by their complication, involving a degree of care and attention that makes their use impracticable in the majority of instances.

The Hazelton boiler, illustrated on this page, is now attracting much attention in all parts of the country, and is believed by those most familiar with the subject to be the most marked improvement ever made in this direction, and to embrace the best principles ever combined in any form of a steam generator. The general design of the boiler is such a radical departure from all other styles heretofore used that it at once challenges attention, and to those who may not be familiar with the extent to which it has already been introduced and the length of time which in some instances it has been in operation, it might be regarded as somewhat of an experiment.

The evidence submitted, however, in regard to its practicability and success is most conclusive. It may be here stated that there are now upward of 100 of them—aggregating some 13,000-horse power, operating in the Eastern States—in many instances subjected to the severest tests, conclusively demonstrating their practicability and the possession of the highest merits.

There are certain distinctive features of the Hazelton boiler which must commend it to all users of steam, among which may be mentioned the fact that it requires less floor space and weighs less per horse-power than any other. It is claimed to be economical to the last degree, having a larger amount of heating surface in proportion to weight and area than is possible in other form of construction. It produces dry steam; the circulation of the water is so perfect that but little scale will form upon any part of the boiler; complete combustion, with natural draft; facility for using the lowest grade of fuel, such as shavings, sawdust, tanbark or any other combustible material. It does not prime even with salt water. Very little radiation of heat from the outer shell.

The illustration being a sectional one, a more detailed description may be necessary to enable our readers to get an intelligent idea of its construction. It consists of a vertical central column with horizontal tubes radiating from it at all points, the holes in front of the column representing the openings into which the tubes are set to complete the circle; the size of the columns as well as the number, length, and size of the tubes determining the capacity; two-thirds of the height of the column represents the water space, and the remainder the steam. The part of the column below the grate-bars forms the mud-drum, into which all the sediment is precipitated and removed through a blow-off pipe. The mud-drum is



SECTIONAL VIEW OF HAZELTON BOILER.

provided with a manhole, which affords access to all the interior parts, so that every tube can be got at to scrape out or repair, should this be necessary. The tubes are welded up at the outer end and subjected to a pressure of 600 pounds to the square inch. They are then expanded into the column with the ordinary tool used for this purpose. The tubes are set stag-

gered, so that the flame impinges directly upon all. The grate-bars extend entirely around the vertical center column. The boiler is fired through two or more doors, depending upon size and location. At the top of the jacket is an iron cone-shaped hood, with iron smoke-stack, which can be run up either straight or connected with a brickstack, as desired.

The cut on page 189 shows the boiler with brick setting complete. The Pacific Iron Works, of this city, are sole manufacturers for the Pacific Coast. A representative of the PRESS visited the California Cotton Mills at East Oakland last week, where they have a 150-horse power Hazelton boiler at work. It is doing excellent and exceptional work. Another one of 200 horse power is now being built for the Spring Valley Water Co., and there are several orders on hand for other boilers for various parties.

Mines Around Sierra City.

In conversation with Mr. G. T. Fletcher, of Sierra City, this week, we learn that mining affairs in that part of Sierra county are quite lively. The Sierra Buttes, Young America, and Phoenix mines are all paying well. The latter has been bonded for \$30,000. The Young America is temporarily shut down for lack of water. At the Sierra Buttes they have between 300 and 400 men at work, and the Young America gives work to some 300 when running. The reason of their temporary stoppage is because the wood gave out, and they had to stop pumping water from the lake. The Phoenix has all the machinery ready for the big mill, but the storm prevented their getting it in this winter. They have built a flume about four miles long, two feet deep and three feet wide, to bring water in from the Yuba river. The flume was not quite completed when the stormy weather stopped further work. The snow was deeper than had ever been experienced, there being five feet eight inches in Sierra City and about four feet in Downieville. It was eight feet deep on the Summit between Sierra City and the valley.

On his trip down Mr. Fletcher states that they had to put snowshoes on the horses for some distance. These horse snowshoes are ten inches wide, one foot long, and have the corners rounded off. They are made of gum belting. The horses soon get used to them. At first they are awkward with them on, but soon learn to step wide, and then get on all right.

The outlook around Sierra City is very good. At Gold Valley they expect to spend \$200,000 on the Empire mine. The company which bought it is putting up chlorination works and will erect a big mill. Part of the machinery went in last fall. It is an old mine, with rebellious ore, which could not be worked. Mr. Fletcher states that they now have some process which has been used in Arizona with success, and which will admit of their working this ore at a profit. Several mines have been discovered at Gold Lake, and on one a mill will be put up this spring.

In Sierra valley this winter the thermometer has gone down as far as 16 degrees below zero; at Sierra City the lowest was 10 degrees above. Sierra City has about 1500 inhabitants, and more are coming in. Some 30 new residences will be put up this spring, and there are now no vacant houses. The Sierra Buttes, Young America and Phoenix mines will employ directly about 1000 men. Then all the mine supplies, coal, timber, spiling, etc., are furnished by others, so that some 1500 to 2000 men are kept at work on wages by these mines. There is some little litigation about water rights between the Sierra Buttes and Young America mines, but aside from this everything in that region is going on prosperously and smoothly.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Mexican Mines.

The Gold Veins in Sonora.

EDITORS PRESS:—In looking over some of your former issues—one of October 9th especially—I notice you refer to the Hebrews in Egypt, who, having no straw, could supply no building material, etc. I propose furnishing you the straw from the mines of this region, although a foreign country. What I tell you shall be strictly true, you to furnish the mud, as agreed. Of course this is not different from other mining countries. We have very many very poor mines—non-paying. About one out of every hundred may pay to work; yet at this rate we have good mines, some of them very rich. I call a mine that will furnish plenty of \$100 ore a rich mine, and it is, in any country. We have some here that will go up to the above, and many that will go to \$60, \$80, etc. I own a mine eight miles north of this city—the Virginia. It has nine feet of ore that will average \$38 per ton in silver and 58% of lead. It can be easily worked. There are good roads from the depot of the Sonora railroad to the mouth of the mine. I call this a fair mine. The shaft is down 85 feet, is 6x8 feet, inclines about 80° northeast. Water is five miles away, except what can be obtained from wells. Wood is plentiful, but there is no timber, and none is required. At the station of Torres, two leagues north of the station, I own the Kansas City mine, the ore of which is very base indeed. The vein is five feet in width, and will average \$80 per ton. All the assays I have had return \$130 per ton; but I wish to be on the safe side. It is black sulphurets full of the pyrites of iron, antimony, etc., with some lead, but not much. The shaft is 140 feet deep, 8x10. The walls, both hanging and foot, are solid. No timber is necessary. Wood and well-water are abundant. One may trace this ledge for 10 miles on the surface. There are good roads to the station.

I own a gold mine 10 miles above Bacuache, evidently the mother vein that supplies the rich placers below it, and which every one has heard of, for they are old and noted in history. This shaft is 100 feet deep, 5x7; vein 7 feet wide so far as seen, although the hanging-wall is much shattered, and not in very good condition. The vein or pay streak is full five feet in width, and will run from \$40 to \$200 per ton. A bold, never-failing spring gushes out of the mountain just by the vein. Fine pine timber is abundant. The road is fair until the last league is reached, when there is a good trail for packing. This trail begins at the foot of mountain. I call this a big thing for some party who is able to work it, which can now be done comfortably and safely. Formerly the Apache Indians held these parts. It was their stronghold. I am also owner of the San Juan mine at Carbonaro. It is a large vein between walls, but the pay streak is only 2½ feet, which will work to \$100 per ton. The shaft is 100 feet deep, 8x10. The road is fair.

All the mines in this vicinity are paying mines, and worked by Messrs. Tooker & Hardwick, who are shipping ores constantly to the line, to the smelters in the United States. There are many such mines here as I have above described, which are not being worked, for they belong to very poor men for the most part, and many of them are denounceable to any person who may wish them. A smelter here in Hermosillo would be the thing for these miners, the ores being rather too low grade to pay to ship, while they would pay very well to haul the ores 5 to 20 miles. In a radius of 25 miles I can name about 50 mines, none lower grade than I have mentioned, and some of them higher.

I own a group of three gold mines within a radius of half a mile of each other. The veins will average six to eight feet in width. The ore average, per assay, \$100 to \$300 per ton. This is big talk, but perfectly true. A small spring of pure water at the mines is invaluable. There is plenty of tall pine all over the mountains, with good roads from Tombstone to the foot of the mountains.

All the country is excellent for stock-raising, especially about Bacuache, for it is well watered. The Yaqui River country is now open for settlers, and it is a fine rich country. Many orange trees are being sent over there to set out on ranches. All this country could be easily cultivated by a small outlay of money and a little effort. Artesian wells could be made, and an abundance of water obtained anywhere, I think, at from 25 to 100 feet deep.

PAUL GREGORY, M. D.

Hermosillo, Sonora, Mexico.

Treatment of Black Sand.

EDITORS PRESS:—Referring to the article under the above heading, in your issue of Feb. 26th, permit me to suggest a trial of the sulphur process in the fire assay of the material discussed. I think the method would give satisfactory results as to gold. The dressing would be about as follows:

Ore.....1 part
Soda.....3 parts
Borax.....1 part
Litharge.....1½ parts
Some flour or charcoal, and enough of sulphur

to convert all of the metal present into sulphide, including the lead of the litharge; mix; cover with salt and heat to low redness in a clay, sand or black-lead pot for some time; then introduce some metallic iron in the form of large nails or thick wire, and raise the heat gradually to very bright redness for 20 to 30 minutes or more, according to the quantity of ore treated. Remove the nails, after washing off any adhering lead in the slag, and either pour the assay into a mold, or cool and break the pot. Cupel the lead button, etc., as usual. If platinum is present the parting process must be modified accordingly.

C. H. AARON.

Academy of Sciences.

President Harkness occupied the chair at the meeting of the Academy of Sciences, on Monday evening. Dr. F. V. Hopkins was elected a resident member and Dr. Carl von Hoffman was proposed for membership. Specimens of tin ore and of tin from the Black Hills were presented to the museum by Melville Attwood; also piece of petrified wood from Mount Ranier, by R. S. Floyd.

The librarian reported that since the last meeting the contributions to the library had numbered 57, including pamphlets on "Volcanic Action," "Dissecting a Mountain Volcano," "West Coast Botany," "Quicksilver Statistics," "A Catalogue of Known Plants," "Meteorology of the City of Oakland," and many others of an interesting character.

Dr. Behr read an interesting paper by Dr. Mrs. Mary Curran on "Lichens of the Vicinity."

Dr. C. C. Parry also read a paper on the "Pacific Coast Alders." He said that California might justly be proud of her alders, which attain a greater size and are more frondaceous than those of any other country. Of the 14 species of alder known to botanists under the old-established genus *Alnus*—widely scattered over the world—four are enumerated in the botany of California. Of these, one is a high mountain shrub, common also to the Atlantic Coast. Another peculiar Pacific Coast species, the red alder, ranges from Alaska to Central California, five species of which may be seen in the vicinity of Berkeley. What is known as the common California white alder, is the ordinary species met with along the watercourses throughout the State, and has been included by botanists under two distinct species—*Alnus Ohlongifolia*, or the long-leaved alder, and *Alnus Rhombifolia*, or the round-leaved alder. For reasons given in this paper these two species are included in one, the latter, being the oldest name, having the priority. It is this species, varying in size in different parts of the country, which exhibits some of the largest trees belonging to the genus, not unfrequently obtaining a height of 80 feet, with a smooth columnar trunk, two or three feet in diameter at the base. One peculiarity of this species is its very early period of flowering, which, in the southern counties, commences in December and is completed by the middle of January.

In reply to a query by President Harkness, Dr. Parry said that the wood of this species was not particularly valuable. It made good charcoal and was used for some other purposes.

Wood River Ores.

It looks to us as if we would have to again look to Denver and Omaha for a market for our ores. When the annual contracts with the leading mines here expired by limitation, last December and January, and the Omaha and Denver smelters announced that they would not renew on the old basis, it was thought that, with the Interstate Commerce law in force, the nearer smelting works of Ketchum, Salt Lake, Portland, Reno, and San Francisco, would at once come into this market and eagerly avail themselves of the opportunity to secure our ores. But the reverse has been the case; for while the managers of the smelting works at the points above mentioned have all seemed anxious to buy our ores, as is evinced by their numerous letters of inquiry, none of them seem willing or able to give a basis of rates upon which a bargain could be concluded between buyer and seller, between the ore-producers and the agents of the smelters, although some are willing to close upon the very indefinite basis of a fraction below the "ruling" Omaha rates, which are subject to frequent change. It may be that this uncertainty is due to the ignorance in which all parties concerned seem to be in regard to the effect that the Interstate Commerce law will have upon rates to this point, and especially upon the rates upon bullion from the smelting works to the refineries. But, whatever the cause, the result is the same to us, and that is, that there are practically no buyers for our ores here at present.

If other buyers do not come soon, or, say, by the first of April, the date upon which the Interstate Commerce law will go into effect, our ore-producers will be compelled to ship to Denver or Omaha, as of yore, as better rates and quicker returns can thus be obtained than by selling elsewhere.—Wood River Times.

COLONEL J. J. TOBIN, the new Commissioner of the Bureau of Labor Statistics, has taken possession of his office.

Mining River-Beds.

A correspondent of the Tuolumne Independent writes as follows to that journal: Having had occasion to visit the Garibaldi quartz mine, on the Stanislaus river, near where a steam elevator is in operation taking up the gravel from the river channel, we will give a description of the machine and method of working. A boat, 40 feet in length and 20 feet in width, on which is placed the machinery for hoisting purposes and for washing the gravel as it is drawn from the bottom of the river, by means of a powerful fan-suction pump driven by a steam engine. A length of suction pipe, connected with the pump, is lowered down to the gravel, and when the pump is set working it draws the sand and gravel together with a large volume of water, which is discharged in sluice-boxes fixed to the deck of the boat, the discharge being continuous. Rocks weighing over eight pounds are taken up and discharged into the sluices by action of the pumps. Divers go down in submarine suits and clear away rocks too large to pass through the suction pipe, and to loosen up the gravel with picks and bars, when found too solid to be acted upon by force of the pump. The machine is floated from place to place as occasion requires, and is, in every particular of its mechanical construction and application, a success; but it is a question with us if it can be profitably used in working out the channel of the Stanislaus river. The question, however, of the practicability of the machine in working the river-bed remains for the future to disclose. Be it understood, then, that it is not by any means the aim of the writer to discourage any mining enterprise, much less this system, or any system by which sections of our rivers, not worked in the earlier history of river mining, may be profitably worked at all times of the year, except during extreme high stages of water. Unsubmerged bars, and bars uncovered during low stages of the river, where the richest gravels were deposited along its course, are practically exhausted in most parts; yet there is no doubt but there still remains much of the old diggings along the river-banks, which, by turning on a large volume of water and "booming," can be made to yield up large dividends to the toiler. We shall endeavor to keep informed on the progress made in this system of river mining, and wish the enterprise a success, whereby a new and more prosperous era may be brought about in this branch of mining industry.

Arizona's Gold and Silver Product.

The precious-metal yield of Arizona for the year just passed, considering the obstacles that had to be encountered through the cause of the Indian war, and the consequent lack of mining enterprise, according to statistics, exhibits a magnificent showing for the precious-metal production of our Territory. For the year 1886 the gold dust and bullion forwarded by express from the Territory was \$583,827, and the gold dust and bullion forwarded through other sources and conveyances was \$100,000. Of silver bullion expressed we find that \$1,371,083 were produced, and of ores and base bullion it is ascertained that the enormous amount of \$4,048,468 worth have been forwarded to the various smelting and reduction works throughout the country, outside of our Territory. The probable cause of this is explained through the superior means of railroad transportation, lack of faith or interests in our home smelting, reduction and milling works, and the scarcity of local reduction works nearer than the line of railroads. If this outgo could be in some way averted, it would add much prosperity not enjoyed now to our Territory. The remedy is local reduction works adjacent to mining centers. To say nothing of the unknown amount of ores and bullion taken from "mother earth" by her army of sons, chloriders, we find that Arizona's gold, silver, base bullion and ores known to have been produced during the year 1886, was \$6,103,378. All considered, this is a most magnificent mining exhibit. Our vast mineral resources are as yet only merely prospected, and there is not, perhaps, more than one or two mines in the Territory that an "educated miner" considers "opened." The possibilities of this country are of such magnitude that a man would not care to predict them for the fear of being called a "crank."—Arizona Enterprise.

LUCKY BUYERS OF INVENTIONS.—The life dream of a Lowell lady has been that the number 272,751 was to be her lucky number. Some years ago she invested a small amount of money in letters patent, bearing the favorite number 272,751. She claims the purchase was made to assist the inventor, who lost his health in the late war, rather than for her own speculation, notwithstanding her belief in the number. After years of patient waiting she has been assured by some of the best judges in the State that she had chosen a lucky number, as it appears to-day that the goods which this patent covers are of considerable value. A Pennsylvania manufacturer tells a story of the inventor of a multiple of rolls or trucks used under the bottom of railroad cars between the truck-frame and the body of the car. The inventor became pressed for funds and desired a loan of \$100, assigning his patent as security.

Out of sympathy, the manufacturer gave him the money, never expecting, as he says, to ever get a dime of it back, and threw the patent papers aside in his safe, where they lay undisturbed for 10 years. One day a lawyer of his acquaintance called at his office and inquired if he ever bought a patent on friction rolls for a railroad car. After reflecting a moment, he told him that about 10 years before he had loaned an inventor some money on a car patent, but he didn't ever expect to hear from it again. The lawyer told him that this patent was being used on almost every car now being built, and a large revenue could be collected. Terms were soon negotiated for collecting evidence of infringement; so that the loaning of \$100 to help out the distressed inventor brought him more money than all his other business.—Boston Journal.

NICKEL IN NEVADA.—Competent judges pronounce the cobalt and nickel mines of Churchill county the best in the world. Nickel is a metal which is entering all branches of metal manufacture, and its use is spreading rapidly. This general use renders it a very valuable metal, and a nickel mine which yields a fair quantity of ore is a good property, readily salable. The supply is still so small as compared with the increasing demand, that owners of nickel are not liable to suffer from a depression in prices, owing to an overstocked market, as are the owners of lead, copper and silver. Heretofore there have been no noteworthy discoveries of nickel in this country, but it may be that in the eagerness of search for gold and silver, nickel ledges have been abandoned as worthless after a simple gold and silver assay showed but a small quantity of either or both of the precious metals. It might pay our prospectors to give some attention to the character and appearance of nickel-bearing ores, as there is no reason why this country, with its wonderful variety of mineral wealth, does not contain one or more nickel mines. The owner of a good nickel claim has almost a mine of ready money, as purchasers will never talk low figures and delay on account of the condition of the market. The market for nickel will be a rising market for some years.—Walker Lake Bulletin.

TUNNEL UNDER CLAY STREET HILL.—It is proposed to tunnel Clay-Street Hill, in this city. Mr. Joseph Britton, of the Clay-Street Hill cable road, says that the proposed tunnel will enter the ground at Gough street, and will emerge therefrom at Laguna. "It will be about 900 feet in length, about 9 feet in height and 15 feet in width," continued Mr. Britton. "This will just enable our cars to get through, and no room to spare. Owing to its necessary width, the proposed tunnel will be square in shape and will be lined inside with brick. It will be perfectly well illuminated, for openings will be made in the street amply sufficient to let as much daylight in as will be required. At night the brilliancy of the electric light will be called into requisition for the same purpose. If this Board of Supervisors allows us to build this road, it will enable us to provide direct cable accommodations to a very large section of the city and to open it up. Apart from this, however, an extension of our system is now a necessary measure of defense with us, by reason of the construction of the Sacramento-Street road. We are the pioneers in the cable road system of San Francisco, and do not at all desire to be left behind."

THE "AMADOR LEDGER" has appeared in an enlarged form, so as to keep pace with improvements in its region. The *Amador Ledger* is one of those interior papers which pays great attention to its local mining interests, and we never fail to find, in every number, more or less mining items. It is doing good work for its county in this as in other ways. The city papers are to a great extent dependent for current mining news on the local papers, and if they would all, like the *Amador Ledger*, make a point of collecting and publishing all that is available, they would find it of great advantage to their mining interests. The *Ledger* is a good representative interior journal.

IN the District Court of Helena, M. T., judgment by default has been rendered against the defendants in the case of J. W. Seligman & Co. vs. the Gregory Mining Company for \$65,000. The case arose from the capture last January, by the miners at Gregory, of Hon. A. J. Seligman, son of J. W. Seligman, the rich New York banker, who was forcibly held at the mining camp until the New York Seligmans guaranteed the payment of back wages to the amount of the judgment obtained.

MESSRS. GAGE AND LEACH, of the Grand Central mine, Tombstone, A. T., about three months since bonded the Beck mine for \$75,000, making at the time a considerable cash payment. For some reason best known to the purchasing parties, the mine was soon afterward shut down, causing much wonderment among disinterested parties. Now, however, the property has been accepted, and a full force of men will be put to work.

THE Omega Gold Mining and Ditch Company has been fined \$500 by Judge Sawyer for conducting a hydraulic mine in contravention to the order of the Court. Damages were ordered by a recent report of the Master in Chancery. The company was given ten days in which to pay the fine.

The Proposed New Harbor at Los Angeles.

The most interesting and important engineering project which has recently been inaugurated on the Pacific Coast is the proposed new harbor for Los Angeles, at "La Ballona." An association of gentlemen, with a strong backing of capital, has been organized to carry on the work, which is already in an advanced stage of progress under the general management of Mr. James Campbell, well known on this coast.

Character of the Work.

Ballona lake is a body of water three or four miles south of Santa Monica, lying a few feet only from the seashore, and connected therewith by a shallow creek. The lake is from two to three miles long and about 600 feet wide, with an average of some 12 or 15 feet in depth. The soil is of a light sandy nature and easily handled with dredges. The work of constructing the harbor will consist of enlarging the natural channel connecting the lake with the ocean and excavating the bottom of the lake to a sufficient depth and extent to accommodate both ocean and coast trade.

The shores of the lake will be securely piled, in connection with which will be constructed wharf accommodations, wherby cars and ships may be brought side by side. This ocean connection will consist of an opening 200 feet wide, and of sufficient depth, with heavy piling and proper front and rear supports extending out to deep water, with a flaring mouth to render more easy the access of ships from the outer roadstead. The piles will be squared and securely bolted together so as to form a solid mass of timber, driven down into an under stratum of tough clay, giving the entire structure a firm hold on *terra firma*, to withstand storms. We are told that the entire sea bottom, at a distance of 1200 or 1500 feet from the shore line, consists of clay, and that there is 28 feet of water at low tide. Vessels can, in any ordinary weather, lay outside in good anchorage, with no rocks or shoals, and come in whenever they desire to do so. This fact greatly facilitates the delivery of material during the progress of construction. There is a flow of tide here of about 5 1/2 feet.

Not a New Project.

The construction of this harbor is no new project. It has been talked of for many years, and other parties than those at present holding the property have sought to secure it for a similar purpose. Some 12 years ago an eminent English engineer, Mr. Bernard, the builder of the famous Victoria docks at Edinburgh, examined the locality and expressed the opinion that it would at no distant day become the harbor of Los Angeles, from which it is distant less than two-thirds of the distance to the present harbor at Wilmington. The wharf and dock facilities within the lake can be extended as circumstances and the increase of commerce may require. It is expected that the work will have made sufficient progress by April or May to admit the entrance of

The First Ship Into the Harbor.

A harbor such as this promisee to be—easy of entrance, perfectly safe from sea and storm—cannot fail of adding greatly to the commerce and prosperity of Los Angeles. The work has been greatly delayed by the difficulty in securing piling, but the dredging operations have been carried on with a reasonable degree of dispatch, and piles, lumber, etc., for wharf construction will hereafter be promptly delivered. There is no lack of financial backing for the enterprise. As an evidence of the sheltered character of the roadstead outside of the entrance to Ballona during prevalence of southeasters in the winter months, we are informed that while during the recent southeast storm all the shipping in San Pedro had to hoist anchor and go to sea for safety, a ship at anchor off the harbor of Ballona rode out the storm without any trouble whatever.

The Work Already Done

Has created quite a boom in railroad building and in real estate transactions throughout all parts of the county. A company was organized some time ago to construct a double-track railroad from Los Angeles to the new harbor, the grading of which is in progress. Other roads are also in contemplation, both for Los Angeles and along the coast both north and south. The Atchison & Topeka will make a temporary connection with the ocean at this point, and will, no doubt, put on a line of fast boats to convey their passengers from thence to San Francisco. The construction of this harbor has opened new the rivalry between that and the Southern Pacific. There is no doubt but that these two roads will present a sharp competition for the overland business. Both are backed with almost unlimited capital, and with genuine push and enterprise. There will hereafter be a genuine competition between New England and California capital, or, as it has been otherwise expressed, between Noh Hill and Bunker Hill, and by it California will be largely benefited in both her transcontinental and in her local traffic.

Government Aid

Has not been solicited in this enterprise. Some steps should be taken to call the attention of the proper authorities to the claims and advantages of Ballona. A survey of the locality and a report

upon the matter should at least be obtained. Such a report would be of the highest moment, and national in character and importance. We are not aware that any steps have been taken to secure such attention, or even whether it is desired by those now engaged in the enterprise; but it is plainly within the scope and duty of Congress to act upon the matter, and we trust that some member of the Pacific Coast delegation will take the matter in hand at an early day.

In Los Angeles County.

Our engraving presents a few scenes in the San Gabriel valley and a pretty view in the Wolfskill orchard in Los Angeles City, showing especially a row of banana plants thriving in the open air. The upper scene in the engraving will give a general idea of a vineyard and orange grove, while far beyond are the slim plums of the sycalypsus. The San Gabriel valley is one of the grandest stretches of ground in California, of vast extent and varied adaptations, bringing forth under the magic wand of the irrigator a great profusion of valuable productions.

This view at Sunny Slope shows the residence of Hon. L. J. Ross, an agriculturist of great re-

The Cork Oak.

As we have started on the growth of the cork oak in this State, and the trees, now about 25 years old, have demonstrated the adaptation of our soil and situation to the tree, it is of interest to note corky information from the old producing countries. At the last meeting of the State Horticultural Society, Prof. Hilgard made some remarks, alluding to a recent French publication on the subject. It was shown that the supply of cork was diminishing, and that for certain purposes no good substitute for cork has yet been found. On the other hand, the uses of cork have multiplied. The cork plantations of France are becoming less in area and as yet little has been done to restore them. The subject is now being agitated in France, and the planting of cork oaks should be considered in all countries where it is likely to succeed. Of course such plantations must be considered in the light of permanent investments, and the benefits will accrue chiefly to our children and grandchildren, because of the length of time which must elapse before the trees are large enough for stripping.

There are two species of cork oak, the *Quercus suber* and *Q. occidentalis*. They adapt

nearly one-quarter over the old. It is understood that in the removal of the cork, the stripper does not go down to the living layer, and therefore does not actually expose the wood.

Prof. Hilgard, in closing his remarks, alluded to a possible large demand for cork dust, in which to pack California fruits for shipment, and stated that samples had been shown him of a corky bark produced in large quantities in Yesso, Japan, which seemed to be well adapted for packing purposes. If it should be found so, it would probably prove of much value on this coast.

Young cork trees are now growing at the University from acorns produced upon trees in Calaveras and Los Angeles counties. A plantation has already been made on the hills back of the University, and it is expected that young cork trees will be ready for distribution next year.

Industrial School at San Quentin.

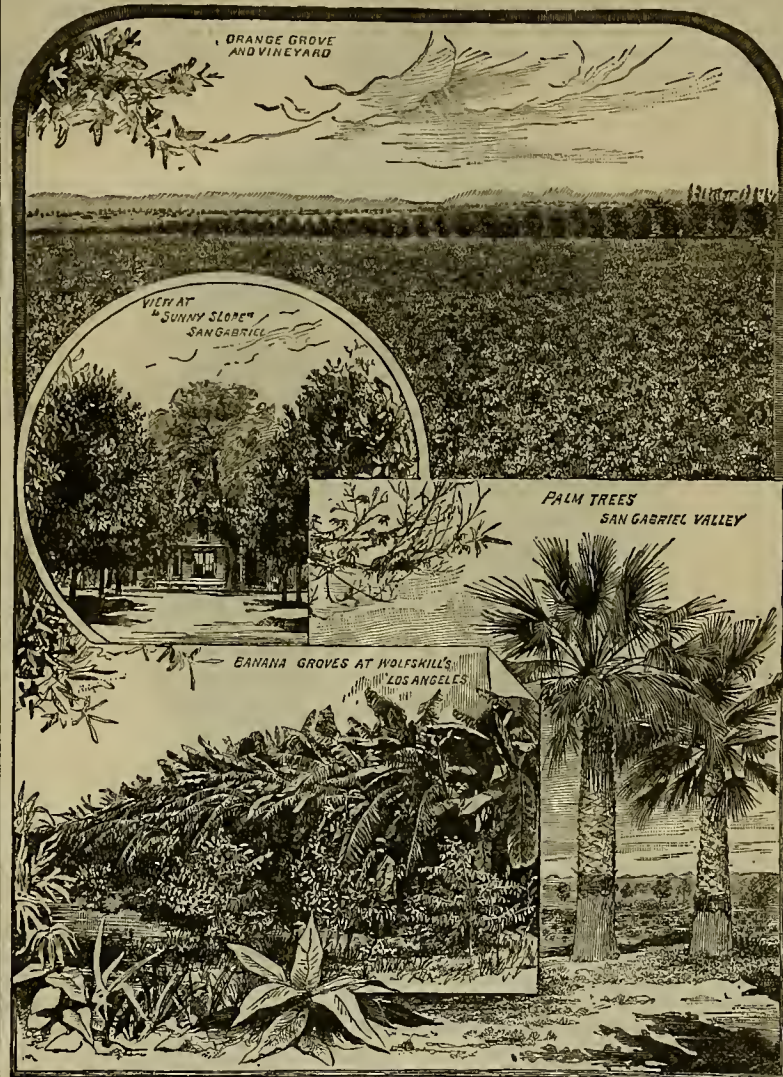
It is stated that when the Senate Committee visited the State Prison at San Quentin Senator Jones, of Butte, asked how much it would cost to convert the door and sash building into cells for the occupancy of criminal boys. His idea was that it would be wise and humane to start a State industrial school inside the penitentiary, where criminals of this class could be taught some useful vocation separate and apart from the hardened veterans of crime. The suggestion is a good one, and will command the approval of every kindly nature. By all means do something of the kind, and if the aforesaid building cannot be spared or adapted to this purpose, then erect another. It would be hard to find any one who has made penology a study that has not denounced this folly and cruelty that herds in the same workshop young offenders along with the old and experienced villains who delight in the artifices and tricks of vice and crime. It is a vicious atmosphere for a boy to breathe in. The unconscious magnetism of such surroundings is debasing and perilous to every hope of reformation. It should always be assumed that there is something good left in a boy. That, however, had he may seem, there is still lingering in his soul some flickering sense of shame and quivering of the moral nerve of feeling that under judicious treatment may be quickened into an honest desire to lead a better life.

We are all more or less the creature of environment, and many of these had boys are the victims of the evil forces at work in the community. They have been wrecked upon social reefs. They have been swept away by the swift torrent of city habits, customs, and ways that older and maturer minds find it hard to stem. We were born with no purer blood than they, and might have gone astray as they have had we been reared in the same crowd and educated in the same domestic school. What sense is there, then in placing these unfortunate youths in the society of those who neither fear God nor honor man, who sneer at virtue and honesty as phantoms of the conscience, and look forward to the termination of their sentence as the time to wage a more cunningly contrived and relentless war upon society? One of the chief objects of the State Prison is the reformation of the criminal, but our present system, at least so far as the boys are concerned, is a mere recruiting station for the army of crime. How can they learn the beauty of virtue in daily contact with vice? There can be no hope of amendment under such circumstances. It is too high a marvel to expect. The chaplain may pray, preach, and distribute good books, but one hour in the prison workshop is enough to ravel out and dissipate every good intention. By all means give these youthful criminals a better chance to redeem the future.

THE TRANSVAAL GOLD FIELDS.—A Washington special says: Vice-Consul Knight reports to the Department of State concerning the Transvaal gold fields, that the wonderful Shelly reef has been eclipsed by another reef discovered last summer and known as the Thomas reef, from which samples of quartz weighing 3000 pounds, it is claimed, yielded 148 ounces of gold. These discoveries naturally gave an impetus to prospecting on a large scale, resulting in the discovery of marvelously extensive and rich gold quartz veins. The Vice-Consul says he believes that, after making inquiries and from the best information obtainable, the Transvaal fields, when fully developed, will prove among the richest in the world. The recent discoveries have naturally given rise to no end of speculation and mining ventures, and a great rush of capitalists, miners and adventurers has set in. Near Shelly reef the city of Warherton has sprung up as if by magic, numbering already 7000 to 8000 people, and is rapidly increasing. The report concludes by cautioning all persons without means not to venture into the gold country unless they have thorough practical miners, as the conditions existing are very hard, and many will be doomed to bitter disappointment.

BACK NUMBERS WANTED.—In order to complete certain files of the MINING AND SCIENTIFIC PRESS, we should be glad to get certain back numbers. Any one having any of the following numbers of the PRESS will please communicate with this office:

1859—Jan. 2d, 9th, 16th, Feb. 27th, March 20th, April 17th, 24th, May 1st, June 12th, 19th, 26th.
1875—Sept. 11th.
1880—July to December.



SCENES IN LOS ANGELES COUNTY, CALIFORNIA.

pute and popularity, who has done much to demonstrate what can be accomplished in California by the use of wisdom and earnest effort. Mr. Rose is at present a State Senator, and won much praise for his course during the present session. The palm trees on the right are the native California Fan palms (*Washingtonia filifera*), which is one of our grandest native plants. These views will give distant readers a little idea of some of the features of the San Gabriel valley, and form an acceptable addition to other engravings which we have given during the last few years.

SPRING VALLEY MINE.—From the report of the State Mineralogist, Wm. Ireland, Jr., we take the following items of interest connected with the Spring Valley mine at Cherokee, Butte county: The expenditures of the mine from July, 1870, to July, 1886, were for reservoirs, ditches and pipes, \$510,820.50; mining plants and tunnels, \$199,780.55; mining ground purchased, \$419,396.18; land purchased, \$461,435.87; cost of debris canal, \$270,821.43; mining expenses including care and repair of ditches, \$1,759,853.77, making a total of \$3,622,198.44. The value of the gold recovered for the same period was \$5,008,108.62, giving \$1,386,010.18 as the profits for the mine during the 16 years. The same report estimates that prior to 1870, \$5,000,000 was taken from the same locality, making the amount of gold that the Cherokee mine has returned as \$10,000,000.

themselves to nearly all soils, but prefer lighter soils, the granitic and slate soils of the foothills for example, the distribution being probably something like that existing with our "blue oak." As for stripping the bark, there are two methods in vogue. The old style was to begin at the time the tree was 22 inches in circumference, at whatever age, but usually at 20 to 25 years. The first bark is coarse and full of seams and is only fit for coarse uses, such as grinding up for packing, etc. It is necessary to be careful in removing the bark and the section of bark removed should not be over 50 inches in length along the trunk. After the first removal the bark is removed about once in 10 years. Ordinarily there is a loss of 18 to 20 per cent in waste in the bark, and sometimes 50 pounds removed will only yield 20 pounds of good cork. The waste is largely occasioned by little holes and by big cracks. Many trees are lost after stripping by this method, and the bark when removed has to undergo a long process of drying, etc., so that the losses incident to the business are considerable.

In the new style of stripping, the first bark is replaced upon the tree after being separated, and the new bark growing under it is thus protected and the tree preserved from injury by the sun shining on the bare trunk. This method seems to be a great improvement over the old way. Taking into consideration the improvement in the quality of the cork, the advantage of the new method is estimated to be



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SAN FRANCISCO:

Saturday Morning, March 19, 1887.

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Passing Events.

The Fine Gold mines, in Fresno county, are just now attracting considerable attention, and travel in that direction is said to be quite heavy. Some of the mines there are turning out very well. Hildreth is now quite a lively camp.

It has been announced this week that Dr. Cogswell, of this city, is about to make a gift of \$1,000,000 to found a technical school in our midst. With the technological department of the State University, the proposed Leland Stanford, Jr., college, at Palo Alto, and Dr. Cogswell's school, this part of the world will in time offer very superior advantages for industrial and technical training for the young of both sexes.

An evident awakening to the value of our resources is pervading the whole State, and nearly all the interior towns are carrying out or planning improvements. Real estate is advancing everywhere, more particularly, however, in the southern regions, which are also still receiving the largest number of the new settlers. The overflow is coming northerly, however, and the State is rapidly being settled up.

In a very few weeks more the prospectors who have been hibernating for some months will again take the field. They begin their work early in this State. It is evident that there will be quite a boom this summer in quartz mining in California.

St. Louis, Missouri, is just now in the midst of a mining excitement. Capitalists from there are buying mines all over the country,

Another First Discoverer of Gold in California.

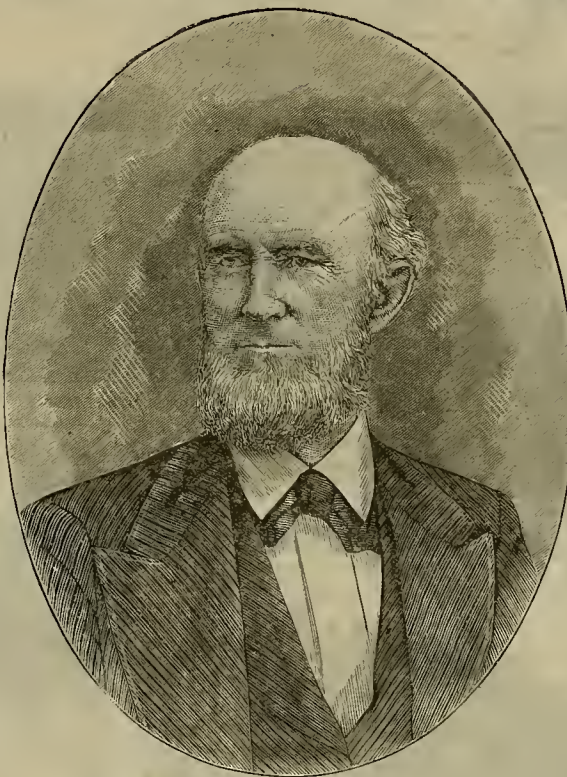
And now have we another candidate for the honor heretofore awarded James W. Marshall, as the original discoverer of gold in California; the claimant in this instance, or rather he on whose behalf such claim is urged, being one John Denton, deceased, and concerning whom the story, as related by a survivor of the ill-fated Donner party, runs in this wise: The Donner party, composed of immigrants to California, while attempting in the fall of 1846 to make their way over the Sierra Nevada, became snow-healed on the eastern slope of these mountains near where the town of Truckee now stands. Denton, knocking off pieces from the rocks used as a fireplace in the cabin occupied by a portion of the party, noticed among the chips some shining particles, which on examination proved to be gold. Collecting about a tablespoonful of these particles, Denton wrapped them up in a piece of buckskin and put them in his pocket. Perishing afterward while struggling to get over the mountains, the hero of this story was hurried, and with him the piece of buckskin and its contents. Aware of this fact, other members of the party, who

down, and, grabbing a handful of the precious sand, brought it away with him. Having eluded their pursuers, the pursued, gaining an eminence and looking back, descried the beach for miles and miles literally covered with sparkles of gold!

Now, for the future guidance of this class of romancers and prospectors, let it be observed that gold, as it occurs in nature, never presents the appearance above described. It does not shine and glitter and dazzle, but is a dull, lusterless metal, no more likely to attract attention than a piece of putty; a fact that by the gettters-up of these narratives should hereafter be borne in mind. In poetry it is admissible to speak of gold as being bright, sparkling, resplendent, etc., but not in sober prose.

While there is no call for excess of zeal in dealing with these harmless legends, so pleasing to the popular imagination, still there must be drawn a dividing line somewhere in this border land between fact and fiction. To multiply the number of original gold discoverers in California, or add further to the hook of the mining apocrypha, already large, would be more than superfluous.

To talk about knocking off pieces of rock and picking out gold from the chips, and this



THE LATE JAMES B. EADS.

had been fortunate enough to make the passage of the mountains safely, determined to go back and hunt for gold in the neighborhood of this reputed find, and would have done so had not the discovery of gold at Sutter's Mill deterred them from carrying out such purpose.

The ignorant romancer, like the unskilled criminal, ever betrays himself. The discoverer of the mythical gold find, in explaining how the thing was brought about, proceeds in his innocent way to tell how his attention happened to be attracted by something glittering in the sand or on the rocks, and which, when he came to take a closer look at it, turned out to be gold. Sometimes this stuff shines with an effulgence that fairly dazzles the eyes of the beholder—it almost flashes with more or less intensity.

When questioned as to how it happens that so little of the gold discovered on these occasions is secured and brought away, the authors of these Munchausenisms have ever a way for explaining this: Sometimes the murderous Indian swoops down upon the adventurous prospector, just as he is about to pick up the first piece of gold in sight; or at that critical moment his gun gives out, or a heavy snowfall impending warns him to leave, or may be, as with John Denton, he "pegs out" while on his way into the settlements, there being always an interposition of providence or of improvidence in the case. The discoverers of Gold Bluff, we are assured by one of these veracious chroniclers, were fleeing for their lives, with 1000 savages, more or less, close at their heels, when one of their number, riding full speed, reached

from rock obtained in a non-auriferous locality, is far from drawing the thing mildly! By no such testimony as this or other tradition of "Starvation Camp," can John Denton hope to establish a claim to being the first discoverer of gold in California. Let the grave-stone for which our Legislature has just made provision be placed over the remains of James W. Marshall at Coloma.

CALAVERAS MINING NOTES.—One of our correspondents who is traveling in Calaveras county states that mining matters at Douglas Flat have been at a standstill for a long time, but there are negotiations now pending which will undoubtedly start things "booming." To add to their other troubles, there has been a scarcity of water in the ditch; but a new company has taken hold of it and greatly enlarged its capacity. At Murphys, nothing is being worked with the exception of the Oro Plata, where they are working day and night shifts and look for good results. There will doubtless be considerable work done at this place this summer.

The total sum disbursed to employees by Comstock mining companies during the month of February was over \$200,000—a decidedly good showing for a mining town that is said by some growlers to be played out.

The Carson mint has an appropriation of \$114,500. The money is divided into three classes, viz.: \$29,500 for salaries, \$60,000 for wages of day laborers, and \$25,000 for incidental expenses.

The Late James B. Eads.

Captain James B. Eads, the widely known engineer, died suddenly on the 6th inst. at Nassau, of pneumonia. Captain Eads attained fame from his engineering work at the mouth of the Mississippi river, and from his project of building a ship-railway across the Isthmus of Tehuantepec. He was a practical engineer in every sense of the word, and was held in design and skillful in execution of his plans. For more than a quarter of a century he has been engaged in works of the greatest magnitude, which have given him a wide reputation.

Captain Eads was born in Lawrenceburg, Indiana, May 20, 1820. When about 10 years old his father fitted him up a small workshop, and there he constructed models of sawmills, fire-engines, steam engines, and other machines. When 13, misfortune overtook his father, and he had to withdraw from school and work his own way. His parents went to St. Louis in 1833, and he went with them. The steamer was burned in the night on the way there, and he landed barefooted and coatless. The only opening in the way of business that offered was to sell apples on the street, and by this means for a few months he sustained himself and assisted in supporting his mother and sisters. In time he obtained a situation with a mercantile firm, where he remained for five years. One of the heads of the house having an excellent library, gave him access to it, and he used his opportunity well to study subjects bearing upon mechanics, machinery, civil engineering and physical science.

In 1839 he obtained employment as a clerk or purser of a Mississippi river steamer. He again made the best use of his opportunity to acquire that complete knowledge of the great river which he was afterward able to turn to such good account.

In 1842 he constructed a diving bell to recover the cargoes of sunken steamers. This was followed with a boat of larger tonnage, provided with machinery for pumping out the sand and water and lifting the entire hull and cargo of the vessel. A company was formed to operate this device, and it soon had a business that covered the entire Mississippi river from Balize to Galena, and even branched into some of its tributaries.

At the outbreak of the Civil war, in 1861, he submitted to the Government a plan for the defense of the Western waters. He designed and constructed, in 1862 and 1863, the first eight ironclad steamers in the United States navy. He afterward designed and built six ironclad gunboats with rotating turrets. The gunboats that he built for river service enabled the Government to regain control of the Mississippi, and were of immense advantage in assisting the land forces in many notable movements.

In the interval between 1867 and 1874 he designed and constructed the great St. Louis bridge, one of the great engineering feats of this century. The jetty system of deepening the entrance of the Mississippi was carried out by him at his own risk, in the face of the most determined opposition from army engineers, who declared his plans impracticable. Permission was at last granted him to experiment upon the most unfavorable pass. As a result, the largest ocean steamers can sail to New Orleans without difficulty through a channel which was previously only useful to small boats. It may be noted that all his theories on the jetty system have been borne out by experience.

Of late years Captain Eads has interested himself in the great scheme of building a ship railway across the Isthmus of Tehuantepec. His plans on this subject we have described and illustrated fully in the Press. This project will be carried out by the company on Capt. Eads' plans.

Capt. Eads, whose portrait we give on this page, was at one time Consulting Engineer of the State of California, having been appointed to fill the place made vacant by the death of Col. B. S. Alexander.

BAKER CITY, OREGON, wants custom reduction works. Hundreds of discoveries within a few miles of that city are owned by men too poor to erect a mill on their property for the reduction of their ore; but if Baker City was supplied with reduction works they would be constantly furnished with ore for crushing and thus open up a new field of industry for the laboring classes.

Slimes in Ore-Crushing.

We had a conversation this week with Mr. F. B. Morse, superintendent of the Willard Mining Company, at Murphy, Calaveras Co., where they have had some very interesting experience with the question of sliming of ores in crushing. The ore is quite peculiar, and slimes badly under stamps, so much so, in fact, that it was a losing proposition with an ordinary mill. They finally settled on using the Tustin mill, which is found satisfactory and makes very much less slimes. Mr. Morse states that it is found by experience that one Tustin mill equals in capacity six stamps. He says it works a cheaper than the stamps, and as now made is a very perfect machine. One set of steel castings for this mill he is sure will last for several years. With the stamps they only got 12 per cent out of \$12 rock, which, of course, would not pay.

Mr. Morse has made some very careful experiments for purposes of comparison, everything being weighed, assayed and tested with precision. With the stamps, crushing through a No. 6 slotted screen, with two-inch discharge and narrow mortar, they used to get 45 to 48 per cent by weight, that he could slime off by shaking and pouring off water quickly from a pan. Some 90 per cent of the value would go off in this way.

In the Tustin mill only from 8 to 12 per cent of slimes were made, crushing through a wire screen of corresponding number to that used with stamps. They could slime off from 8 to 12 per cent by weight, with proportion of value in slimes about the same as above.

Mining men who see the ore say it is easy to concentrate. But none who ever tried it could crush up the rock by hand in mortar and save 25 per cent of the sulphurets. It shows that the stuff will slime at the slightest blow. The galena and zinc blende in the ore are had. The galena runs high in gold and the zinc blende in gold. The rock must be worked very carefully. In crushing, no chance must be given for a second blow. It is for this reason that the Tustin mill does so much better work on this rock than stamps do. The Tustin screens off as fast as the ore is crushed. The moment a piece of ore is crushed it is screened off and is not hit another blow; this is not the case with stamp batteries. As Mr. Morse puts it, the Tustin has an actual discharge; stamps an accidental discharge. There is a 15-stamp mill on the property now, but it is not used for crushing this particular class of ore. There are four Tustin mills and six Frue concentrators.

At one time they had a lot of 200 tons of ore worked that assayed \$12 per ton. It was put through the stamp mill and over the concentrators. They saved \$2 per ton in gold on the plates, and got concentrates that assayed \$25 per ton. The tailings assayed nearly \$10, and there were three tons of concentrates.

Another lot of the same ore was then run through the Tustin mill, and they got out in gold and concentrates over \$10 per ton—nearly \$11. The run was made under the same conditions in both cases, concentrators and all. From the stamps they recovered \$2.25 per ton, and from the Tustin mill \$10 to \$11.

In one case they got \$2 in gold and 25 cents in mineral, and in the other they got \$4.50 in gold and \$5.75 in mineral. This test went to show that the stamps slimed the ore more than the other mill. The gold is very fine. The amalgam from the stamps retorted one-sixth, and that from the Tustin retorted little better than one-fourth.

Mr. Morse has no interest in the Tustin mill, but finding they could not use stamps to profit, considered that would be the best way. He first thought of using the Cornish rolls, but then saw the Tustin machine and thought it would be better than the rolls, as it has no fixed hearings, so there is even less chance of sliming the ore than with rolls. Experience has borne out this expectation.

THE Order of boiler-makers of California has addressed to the public of the Pacific Coast, and employers of steam generally, a request that in future all boilers be manufactured in this State. The notice is an earnest appeal for the recognition of home industry.

MORE gold discoveries reported near Atlanta, Georgia, have caused considerable local excitement.

Lands Now, Mines Next.

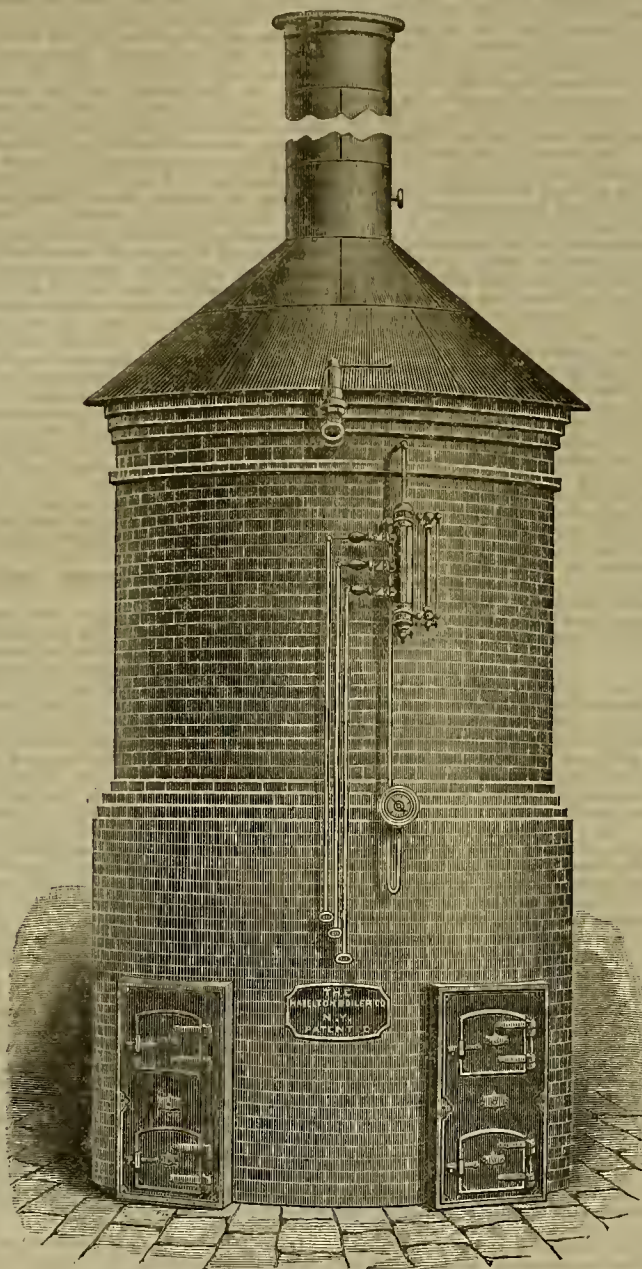
There is just now an unwonted inquiry for real estate in California—the desire of everybody is for land. There is, so to speak, a "boom" in property of this kind, and, while our lines fall outside the agricultural and hucolic, we are "agresable." It is lands now; it will be mines next. Either are good things to put money into. No industry can be more solid and financially healthful than farming and gold mining in California. Conducted with even a modicum of business sense, they cannot fail to be both safe and profitable. They ought to win to them toilers without number and capital without stint.

While we would be glad to see a little more attention paid to mining, that interest is by no means being neglected. It is, in fact, in a very

the experience of the former large land-owners in California, who, years ago, under the impression that land could never be of much value in this State, sacrificed possessions for a mere song, which, had they held on to them till to day, would have made them millionaires.

Proposed Technical School.

It is stated that Dr. Henry D. Cogswell is taking steps to found an educational institution in this city, for which purpose he proposes to transfer property valued at \$1,000,000. Dr. Cogswell is well known as the gentleman who has put up, at his own expense, public drinking fountains in several cities in the United States. The proposed polytechnic school will be one to which any boy or girl over the age of 14 is eligible. The examinations for admission



THE HAZELTON BOILER-ENCLOSED.

prosperous condition. We deprecate any attempt at hoarding the business. The less of this the better. Undue excitements work it nothing but harm, the only parties who benefit by these movements being the dealers in wildcats and the manipulators of the mining share market.

If investors do not want our mines there is no particular necessity for our selling them. The owners are, as a general thing, able to hold them, and may very often find it to their advantage to do so. Nothing keeps so well as gold in the ground. It does not rust or waste or suffer loss by wear, nor does its storage cost the owner anything. The value of a good gold mine, instead of depreciating, grows in value year by year. Therefore the owner, unless forced to do so, should never sacrifice a property of this kind. They will be wanted by capitalists one of these days, and they will then be willing to pay a good price for them. Our miners might learn a useful lesson from

will look to the mental, moral and physical capacity of the applicant.

The building will be erected on the block bounded by Folsom and Harrison and Sixth and Seventh streets, and the length of the main frontage will be 500 feet. There will be at first accommodations for 200 pupils, and these will be enlarged as the applicants increase in numbers. It is proposed to give the students a more practical education than they can now receive in the public schools and colleges, and to fit them before leaving school for the competition which they will find among skilled labor in the shops.

The girls will be taught trades to which their physical strength may be adapted, such as wood carving, engraving and the like. The entire plan of the institution has only taken shape within the past six weeks, but it is stated that by the 1st of January, 1888, the school will be opened to admit those who have passed a satisfactory examination. It is to be hoped that

this gift will be made free from restrictions which may hamper its usefulness. When James Lick first began to give his fortune away to the public, he placed many restrictions in the way. Fortunately, before he died, he saw the bad effects of these, and by new deeds removed them and allowed the bequests to be carried out according to the best judgment of the trustees. Dr. Cogswell's deed of gift has not yet been recorded, so that it is as yet impossible to say under what exact conditions the technical school is to be founded and carried on.

Mining Suits.

A fine of \$500 has been imposed against the Omega Gold Mining and Ditch Company by Circuit Judge Sawyer, payable to the complainant in the mining-debris case of E. Woodruff vs. the North Bloomfield Gold Mining Co. The Omega Co. has been previously reported in contempt for violating the decrees enjoining the dumping of mining debris into the Yuba and Feather rivers.

In the Circuit Court on Monday, Judges Sawyer and Sabin dismissed the suit, entitled the Southern Development Co., of Nevada, against Frank Silva. The plaintiffs alleged that on February 15, 1884, Silva sold them a salted mining claim, known as the Sterling mine, in the Darwin district. The price paid was \$10,000, Silva representing that there was 2000 tons of valuable ore in sight at the time of the sale. The suit was instituted to compel the repayment of the \$10,000.

Suit has been entered in the United States Circuit Court by R. H. Elam and James M. Fadden to recover a judgment for \$31,000 from Lazard Freres & Co., the bankers. The judgment asked is for damages alleged to have been suffered by the owners of the Independent mine, near Pioche, in Nevada, by reason of its closing down in October, 1885, about which time the defendant in the present action brought an action in ejectment against the mine-owners and caused an injunction to be placed on the property, shutting up the mine and closing down the mills. This suit, which the present complaint alleges was brought to harass and annoy the owners, was dismissed because the wrong persons were sued.

The case of the Excelsior Water and Mining Company of Yuba and Nevada counties, Cal., against J. P. Pierce, was argued this week before Judge Wilson. The complaint was brought for the recovery of \$266,000, which, it is alleged, the defendant, as director of the Excelsior Water and Mining Company, caused to be paid out, not of the surplus profits, but of the capital stock of the company. It is alleged by the plaintiff that 19 separate dividends were paid during the regime of the defendant as a director, and that the surplus profits of the company did not warrant these dividends, as they were taken out of and impaired the capital stock of the company. The question to be decided by the court was simply whether the allegations of the plaintiff were supported by the evidence. The defendant denied the allegation, and it was urged that during his regime as director he had purchased, improved and added to the property of the company to the extent of nearly the same amount as that paid out in dividends, the payment of which was now the cause of action.

The large two-story frame hotel owned by the Spring Valley Mining Company, at Oberon, was totally destroyed by fire last Sunday, together with the barns and outbuildings belonging to it. The cause of the conflagration was no doubt the work of incendiaries, as the fire upon first discovery was found in several parts of the building.

The "Allison Ranch" gold mine, limited, is the name of a new company for which subscriptions are asked in London, England. This company has been formed to purchase the "Allison Ranch" mine, of Grass Valley, Cal. It was formerly the richest mine in Nevada county, and if reopened may again become famous.

SURVEYORS have commenced running the line of the branch of the South Pacific Coast railroad from Felton to the petroleum rock deposits, now so extensively used for paving purposes. The line, if built, will be about seven miles in length.

MECHANICAL PROGRESS.

Mechanical Progress.

The inventions and discoveries of the present era are announced in such quick succession, and some of them are so startling in character, that people involuntarily exclaim: "What next!" Indeed, so rapid is the real progress of invention and discovery that the world is now pretty well prepared for anything, no matter how improbable or apparently impossible it may appear.

In the language of a cotemporary, "The many wonderful discoveries of late years in the science of metallurgy, or, more properly speaking, the art of working metals, comprehending the whole science of separating them from other matters in the ore, smelting, refining and parting them, have been of such frequent occurrence that men who desired to invest millions of dollars in a steel plant have hesitated and considered long over adopting any one process in preference to another. * * * The last quarter of a century has witnessed an intense interest on the part of inventors and metallurgists in the manufacture of steel. Its varieties in modern practice are now very numerous, many of them having a peculiar adaptation to a certain specific purpose in the arts. Among them are natural steel, India steel or wootz, puddled steel, or semi-steel cement steel, or blister steel; cast steel, Bessemer and kindred steels, Siemens-Martin steel, steel by the Clapp-Griffiths process, steel by the Bessemer process, claimed by Rees; steel by the open-hearth process, claimed by Henderson; phosphorus steel, the invention of M. Tessie du Motay; mild or low steel, tungsten steel, a steel containing tungsten—a metal of grayish-white color; beside the above, some other varieties."

To the above may be added the wonderful progress which has recently been made in the production of aluminum. Improvements have been introduced in producing that metal which have revolutionized the markets of the world in regard to its cost, and which bid fair to make it, at an early day, one of the chief component materials of innumerable utensils of domestic and other use. In view of what has already been done in this direction, it is by no means an improbable thing to suppose that we may soon see an effective cannon for field use made of this material, and yet so light that it may be trundled over a field of battle by a single animal or even pecked on the back of a mule.

And now comes Mr. I. W. Miles, a blacksmith at Louisville, Ky., with a new process for making steel, who, it is said, converts any common iron into a finer steel than has heretofore been produced, and who announces that he is able to convert iron into the finest and purest steel in a few days at a mere nominal expense. A public test was recently made, and the experiments are reported to have demonstrated that "no metal ever known was equal to the Miles steel." This is certainly saying a great deal in view of what has already been done in this direction. We append an account of some of these experiments as given by the *Louisville Courier-Journal*:

"Mr. Miles then produced a common, cheap, black-handled pocket-knife, such as are made of very low grades of cutlery steel. He had removed the blades and returned by this process, converting them into a very high grade of metal. He then took a common steel key, one of those on his key-ring, and, with the knife-blade, whittled the stem of the key with little more effort than it would require for a good penknife to cut a silver dollar. In this case it was steel cut steel. After whittling a minute or two, he opened his hand, strapped the blade on the palm two or three times, and then, turning up his shirt sleeve, shaved the hair off his forearm with the same blade, almost as neatly as a razor could do the work.

"A thorough and last test of the value of his steel was then made. A bar of ordinary soft tire steel was sent for. When it came, Mr. Miles took it into his forge-room, and in exactly eight minutes he had forged a single small cold-chisel from one end of it, which he tempered by his process. Taking a burglar-proof safe-plate, he put it in a vice, and, with the still warm chisel, cut the hard edges and edges as readily as an ordinary cold-chisel would cut iron. He then substituted a more difficult plate to work on, and while the chisel cut the middle plate readily, it made only a slight impression upon the hard open plates. Mr. Redman then took one of his finest cold-chisels, made of imported steel, and it also failed to cut the steel plate. A decided difference of results, however, was obtained, for while the edge of Miles' chisel showed practically no injury from the attempt, not being turned or broken, there was a great, yawning gap in the edge of the imported chisel."

The inventor is a young blacksmith who has been experimenting with the process for years, and who claims that this tempering is done without expense or skilled labor. He has also a new process for converting iron into steel at small expense. He claims to be able to make steel plates so elastic and hard as to turn a ball fired from the heaviest gun ever constructed. The invention is a secret, not having been patented, and a company has been incorporated to push it, with Charles Godshaw as general manager. It is intended to call the attention of the Navy Department to the discovery and ask for facilities to test the steel made by the pro-

cess. Builders of steel plants will do well to look into this matter before investing further in any of the present appliances. There may be a possible future value in it. So far, the evidence of its value seems to come from authentic sources; still there are many who entertain grave doubts as to the value of the alleged invention. Be the invention what it may, it will at least have the effect for a time to arrest the attention of metallurgists in every part of the civilized world.

Rustless Iron.

M. de Meritens' process for rendering iron oxidizable is attracting considerable attention. He is continuing his experiments and has obtained some further results, which seem likely to be of practical importance. The method of protecting an iron or steel surface by the electrolytic formation of a coating of the black magnetic oxide has already been taken up in France as a commercial process. Experiments in this direction have also been undertaken by the French armaments, and are understood to have led to satisfactory results. M. de Meritens describes his later researches in a note presented to the French Academy, as follows: "When we submit a piece of iron to the action of the current in a bath of cold water, the formation of magnetic oxide does not immediately take place. The surface of the metal is in the first place coated with a layer of the protoxide of iron. This is a body of which little is known at present; it has not been completely studied by any chemist. Berzelius undertook a prolonged investigation of the substance, but he has never completed the work. The protoxide is the least stable of the oxides of iron. If it is produced by precipitation from a salt of iron, it is immediately converted into the sesquioxide. A similar conversion into the higher oxide takes place when the protoxide formed upon the surface of the metal by electrolysis is exposed to the air, or if the electrode is allowed to remain in the bath after the cessation of the current. If, however, the sheet of iron coated with the protoxide is immediately transferred to a bath containing a solution of a suitable salt of some other metal, such as copper, silver, gold, or aluminium, a perfectly adherent layer of this metal is immediately formed upon the iron. It is probable that the action is due to a partial reduction of the protoxide by hydrogen, and the formation of an actual alloy between the two metals, both of which are at the moment in the nascent condition." M. de Meritens exhibited specimens of iron coated by this process with the several metals named above.

RAPID PRODUCTION OF SOFT STEEL.—The English correspondent of the *American Manufacturer*, in a recent letter, says that an important improvement in the method of manufacturing soft steel, in rapid and continuous quantities, is being carried on upon a modest scale at the works of Messrs. Hatton, Sons & Co., Bilston, manufacturers of best sheets and tin plates. The improvement is of the firm's own invention, and they claim to have overcome the difficulties with the old form of converter of Sir Henry Bessemer, in respect to the necessity for keeping on the full pressure of the blast during the tapping out of the metal, as well as securing important advantages in respect of rapidity and efficiency of working. The steel which is being produced is very soft, and adapts itself admirably to welding and stamping. The carbon is exceedingly low, the average being .05 per cent to .10 per cent, and seldom exceeding .15 per cent. The silicon appears to be more thoroughly removed than in the Bessemer process as generally practiced, and Messrs. Hatton express much satisfaction at the working of the new system.

COMPOUND STEAM ENGINES.—The four cylinders of a quadruple expansion engine are arranged in tandem pair with the smaller of each pair nearest the crank shaft, in order that the piston, cover and valve of the smaller cylinder may be withdrawn through the larger. The cylinders are preferably arranged with the first before the second, and the third before the fourth-stage cylinder. The cylinders of each tandem pair are either set close together with a single partition-plate bolted to the bottom of the large cylinder, and containing a stuffing-box, or they are separated by a short space. In the latter case, the bottom cover of the large cylinder is bolted down from the inside, and when removed, leaves a space large enough to allow the cover and piston of the smaller cylinder to pass. In this case, also, the stuffing-box of the lower cover is prolonged and passes through that of the upper cover, the former being packed from inside the cylinder. The arrangement of the valve chests is similar to that above described for the cylinders. Manhole doors are fitted in the sides of the cylinders.

NEW STEAM-ENGINE PATENT.—Chas. F. Chandler, of Newark, N. J., has recently patented the combination in a steam engine of a cylinder provided with a port opening at the end of the cylinder, a port opening at the center of the cylinder and an exhaust port, and two pistons operating in said cylinder and actuating the main shaft by suitable connections, with an eccentric placed on the main shaft and operating the rocking arm, and an oscillating valve having an aperture and a recess in its bottom, and suitably connected with the rocking arm operated by the eccentric.

SCIENTIFIC PROGRESS.

Which is Driest—Steam or Furnace Heat?

A correspondent inquires of *Carpentry and Building* which is the driest, furnace or steam heat. "By furnace and steam heat I mean that which comes to the room through hot-air pipes from an ordinary furnace placed in the cellar, and that given off by steam radiators or steam pipes in the room itself." In reply, it is supposed that the hot-air furnace takes air from out of doors and that a water-chamber is provided for moistening the heated air; also that the steam radiators are of the ordinary kind, and without any connection with the outer air. Under such conditions, the steam heat will be the drier, for the air of the room is heated by radiation from and contact with the radiators, and the amount of moisture in the air remains unchanged. On the other hand, the heated air from the furnace has taken up moisture from the water-pot, and it carries this moisture to the room which is heated. These conditions, however, may easily be changed. For instance, if the furnace has no water-pot, and the day is exceptionally dry, the heated air which rises through the registers will also be very dry, and the effect will be practically the same as if radiators were used, so far as moisture is concerned. Again, if a pan of water be placed on the radiator, the air of the room may be made as moist as is desirable. The whole question simply depends upon the amount of water present in the air, the heat itself, if we may use the expression, being the same in all cases. It should be borne in mind in this connection that the sensation experienced of moist or dry air is largely governed by temperature. Of two bodies of air of different temperature, but each containing the same amount of moisture, the one highest in temperature will feel the driest. This will be understood by briefly explaining that the cause of the sensation of moisture or dryness in air is the evaporation of the moisture from the skin. If the air is dry, a rapid evaporation takes place; but if humid, the evaporation is very slow.

Heating the air does not increase nor diminish its moisture "provided no water nor damp bodies be brought in contact with the air."

A New Tanning Substance from Coal.

There seems to be no end to the variety of new products from coal. It is but a few weeks since the discovery of a new saccharine substance was announced, exceeding all others in the intensity of its sweetness, and now we have still another substance, which will be known as "pyrofluxin," which it is claimed may be economically used for tanning leather, and for disinfection generally. The discoverer is Prof. Paulus Reinsch, of Erlangen, Bavaria. Unlike the generality of such compounds, this new material, it is said, is not a derivative of coal tar, or of any of the distillates of coal, but is obtained directly from coal itself. Pit or bituminous coal contains most of it, and is prepared for treatment by being broken into nuts. The crude pyrofluxin is extracted by repeated boilings in a solution of caustic soda. The pyrofluxin enters into solution, and is allowed to stand for a time. It is then poured off, and a carbonic acid gas is passed through it. The resultant liquor has a specific gravity of 1.025 to 1.030, and holds from 10 to 15 grammes of pyrofluxin to the liter. In its purified form the compound is a fine, non-triturable substance, without taste or smell, non-poisonous, and in appearance like catechu. Some Russian coals contain 18 per cent of pyrofluxin. After the extraction of this material, the coal remains combustible. It is described as being one of the most powerful and effective antiseptics known to science. On this account it is expected to be most valuable for tanning, as being 28 times quicker in action than bark, and producing a better result at decreased cost.

It will be soon enough to give credence to this alleged leather-tanning agent when specimens of good leather are produced.

ELECTROPLATING WITH PLATINUM—ITS USES.—Platinum has not been much used in electroplating, notwithstanding its hard, durable, and protective properties. This is, perhaps, chiefly owing to the practical difficulty of obtaining a good, firm "reguline" deposit. A process for effecting this has, however, been brought out recently by a Mr. Bright, whose patents have been acquired by the Bright Platinum Plating Company, and are in actual operation in London at works established there. Platinum has the advantage of keeping its color where silver, brass, or copper becomes discolored, and will, to some extent at least, replace the use of these metals in electrotyping. It will be highly useful in plating chemists' crucibles and so on. German silver, for example, plated with platinum can be used to manipulate strong acids. By the Bright process, platinum can be deposited on any surface which can be electroplated with other metals.

THE FORCE AND EFFECT OF TERRESTRIAL CONTRACTION.—From experiments by Colonel Totten, Lyell has calculated that a mass of sandstone a mile thick, raised in temperature 200 degrees F., would have its upper surface elevated 10 feet; and that a portion of the earth's crust 50 miles thick, raised 600 to 800

degrees, might produce an elevation of 1000 to 1500 feet. Cooling again would reverse the result. Such cooling has actually taken place, and the contraction has given the earth its irregular surface and gigantic mountain wrinkles. That the process is still going on, we have frequent evidence in earthquake phenomena. In changing to a solid form the earth's shrinkage must have been much greater, as the common minerals lose from 3 to 11 per cent in hardening from a melted state.

A NEW SUN THEORY.—Sir William Thomson, in a recent lecture at the Royal Institution, enunciated a new theory concerning the original condition of the sun. He suggests that its mass was formed by the collision of two cool bodies coming together with the velocity due to their mutual gravitation. This theory is supported by the physical law that two bodies at rest in space, if free from the disturbing attraction of other bodies, would certainly collide with direct impact, and hence with no rotational momentum of the compound body formed by the collision. The velocity which a body thus falling into the sun would acquire is more than 30 times that which our earth has in its orbital motion. The earth speeds along its orbit at a rate exceeding 18 miles per second, but a body falling freely into the sun would have a velocity of 350 miles per second. Sir William Thomson, therefore, calculates that if two cool, solid globes, each of the same mean density as the earth, and of half the sun's diameter, and twice the sun's distance from the earth, should collide, the collision would last for a few hours, in the course of which they would be transformed "into a violently agitated incandescent fluid mass, with about 18,000,000 years' heat ready made in it, and swelled out by this heat to possibly one and a half times, or two, or three, or four times the sun's present diameter."

AN IMPORTANT INVENTION.—A recent invention promises to make the waste of pine saw-mills available for paper pulp. In reducing the wood to pulp, bisulphate of lime has been used, and this powerful chemical acts on the fiber only when heated. Heretofore, nothing but lead-lined boilers would resist its action, and these were too costly and too hard to keep in repair. A German scientist has, however, discovered a kind of brick lining for boilers that serves the purpose. The wood, sawed in small pieces, is digested with the bisulphate in large boilers lined with this brick, heat being supplied through lead steam pipes. Nothing further, except thorough washing of the fiber, is needed. The bisulphate is made on the spot by passing sulphurous vapor through porous limestone kept thoroughly wet. The only mill in this country as yet in Alpena, Mich. Slabs and other refuse of sawmills are used, the bark being removed by machinery. If the process is not covered by patents, nor the mills using them restricted to a small number, there is a prospect that our poplar trees will not be cut off so rapidly in many sections of the country.

FOSSIL CHARCOAL.—A correspondent of the *Scientific American* says: Perhaps charcoal has not often been observed as occurring naturally with mineral coal, though, as a result of metamorphism, graphite is not uncommon in coal districts. In a variety of bituminous coal that comes from Tennessee, there are to be seen along the cleavage planes films of true charcoal, in varying quantity, but commonly thin. This coal has been coming to us for several years, and all the while I have noticed in it the presence of the charcoal. I have scarcely ever put coal into the fire without making the observation; and there is perhaps not a lump, of size at all considerable, that does not contain these films. On close examination I have frequently found that the surface of the films on the broken lumps contains a delicate tracery, closely resembling vegetable impressions. The tracery is not so well marked as a fossil imprint, but not so indistinct as to escape notice.

PHOSPHORESCENT ALUMINA.—Mr. Crooke has communicated a paper to the Royal Society on the phosphorescence of alumina *in vacuo*. In 1879, he showed that ruby (a form of alumina) glowed with a rich red in the electrical vacuum, whatever the natural color of the stone. Recent experiments with a large spectroscopic confirm his earlier observations. The spectrum of the light shows a faint and hazy pair of bands and a double crimson line characteristic of alumina. There are also a pair of fainter orange lines, then a dark space, and after that a continuous spectrum extending to the green. Whether the crimson line is really due to alumina or to impurities does not, however, seem as yet to be beyond all doubt.

ELECTRIC LIGHTS.—At a meeting of the Oakland City Council last week, John Desbeck, attorney for the Pacific Coast Electrical Construction Company, appeared on behalf of the application of the company for an electric-light franchise. He said that the company was a home enterprise and represented California capital. The company has abandoned the Hieth system, and is now using the Wiese patents, which are owned by them. The company is willing to give bonds to comply with the provisions of the franchise. They propose to invest from \$35,000 to \$40,000 in Oakland, and will furnish the lights free for the use of the city during the life of the franchise.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

GRAPE AND APPLE CRUSHER.—August David, S. F. No. 358,597. Dated March 1, 1887. This fruit-crushing machine consists in the peculiarly constructed rotatory cylinder operating in conjunction with the spring-mounted resisting platform, and having adjustable pins, teeth or knives for directing the material to be crushed.

BALE-TIE.—A. S. Hallidie, S. F. No. 358,608. Dated March 1, 1887. This device is intended for securing bales or bundles. It consists of a wire having a loop formed at one end, and having the other end folded upon itself, being twisted and provided with a hook, which passes around the twisted part of the tie, after being passed through the loop of the opposite end. The peculiar arrangement prevents slipping at the point of engagement with the loop.

WASH-BOILER.—Gottfried Bergenheim, S. F. No. 358,589. Dated March 1, 1887. This is one of that class of wash-boilers in which a circulation of the water is provided for by vertically arranged passages or tubes, and in which a false bottom and a clothes-holder are employed. It consists in the improved and novel clothes-holder and in the means for readily and effectively adjusting and securing said holder and the false bottom in the casing of the boiler. The object is to provide simple and effective means for holding the parts in their places in the casing.

HEADER.—Chas. M. Slayback and Wm. H. Slayback, Folsom, Sacramento Co. No. 358,630. Dated March 1, 1887. The invention relates to certain improvements in apparatus for heading or cutting grain preparatory to its being thrashed and cleaned. The patent covers a number of details of construction. The gearing in the center of the machine, driven from both driving wheels, counteracts all side draft, and also balances the weight of the elevator spout, preventing sagging, which causes a side weight on the machine. It also insures the equal distribution of weight and draft, doing away with a great number of gears, pinions, pulleys and bearings, and forms a combination which for durability, convenience, light draft and adaptability to all conditions of grain and unevenness of ground, is, the inventors believe, unexcelled in harvesting machinery.

EL DORADO MINES.—An old miner writes the *Piscerville Democrat* as follows: I have been mining for the last 40 years, almost all the time, and when not at work I am looking around the mining camps learning what I can. I have been in Montana, Idaho, Washington Territory, Oregon and Utah, and all over California, and the mines and climate of California, and especially of El Dorado county, I find the best that I have yet seen. I can count some eight or ten quartz mines in this part of the county lying idle for want of capital to open them.

THE San Luis Obispo Republic says: The La Panza and other gold mines in the eastern part of the county are yielding large quantities of gold since the recent rains. This gold-bearing region extends over a large area, embracing the headwaters of the Salinas and San Juan rivers, much being on Government land, and offers very favorable opportunities for non-capitalists to engage in mining. From \$2 to \$5 a day is made by miners.

At Jenkin Richards' coal mine two veins of coal have been tapped—one six feet, the other seven feet wide. The mine is seven miles from Livermore, and work will be prosecuted when the weather settles. The coal is of better quality than the Mount Diablo. The Livermore Oil Company is actively engaged in boring a well, with favorable indications.

JAS. SAVAAGE and son, while mining near Rogue river a few days ago, caught a large wildcat in their hydraulic pipe. All at once the giant refused to throw a stream of water, notwithstanding they had 150 feet pressure. The water was turned off and a huge wildcat was found inside the pipe.—*Jacksonville (Or.) Sentinel*.

The Western Union Co. has laid its new cable between Port Costa and Benicia. With the exception of a short distance on the Rocky mountains, this cable completes the copper wire constructed between San Francisco and Chicago by the Western Union. The new wire will be worked by the Wheatstone automatic system.

The Chinese who are working placer mines along Gold canyon between Silver City and Dayton now have a good head of water for sluicing. Although they say it is "two pan, one color," the Celestials are undoubtedly making very good wages. They occasionally strike spots of new ground that are very rich.

The plan of the Commissioner of the General Land Office to consolidate the offices of Surveyor-General has failed, and with it the control of all public surveys from the Land Office in Washington. It was proposed to consolidate the offices of Surveyors-General of California and Nevada, and abolish them in 1891.

GOOD HEALTH.

Medical Ethics.

"Seize on the truth, where'er 'tis found,
On Christian or on Heathen ground;
Among its friends, among its foes,
The plant's divine where'er it grows."

Ordinary politeness and justice, and a proper consideration for every man's claims, is the true medical ethical law. Men who earnestly, honestly, conscientiously and religiously seek knowledge do not inquire from what fountains it proceeds; their only question is: Are we recolving the truth? Earnest Christians do not heed whether their Lord was born in a stable or a palace, whether He was found in His infancy on a perfumed, downy bed, or whether in the trough of a stable, lying upon refuse straw; their anxious question, and the only one pertinent to the truth, is: Is He the Son of God? Is He the Christ? Is He the Redeemer of the world?

In a most interesting work, entitled "The Science of Life," by the Rev. J. H. Wythe, A. M., M. D., on page 11, we find the truly thoughtful remark of an inquiring mind: "Truth, which should be the object of all study, is not aided by epithets or personal acrimony." Those who obstruct progress have ere now been compared to Dame Partington, with her mop, trying to push back the Atlantic. What is the object, primarily, of all who pursue the calling of medicine? Is it not, by all and every available means, to ward off disease, heal disease and give relief in hopeless disease, thus to benefit and prolong human life in all its physical, intellectual and moral relations? On every side we see rapid intellectual progress, every encouragement given to scientific inquiry, less theory and more solid work—a thousand-fold more workers with a thousand-fold more resources, their watchword, "onward."

A popular treatise on medicine of the present day contains more information, precisely and practically given, than was at the command of many medical men 50 years ago. And each year, even as the Pyramids of Egypt rose from their broad and solid base to tapering apex, so the mass of human knowledge is becoming a nobler and better structure, making truth the crowning point, from which we have a still more extended vision. Individually and collectively, it is every man's duty and privilege so to ply his lifework that it may not only benefit himself and family, but likewise that largest of families—the human race. Individuals do not all arrive at special knowledge by the same road. Ability, propensity, opportunity, have such immeasurably powerful influences over professional life that for one man to say to another, "You cannot stand where I do, inasmuch as you have reached your conclusion by a different way," is foolish and defenseless.

On the many charts of sea captains who have entered the noble harbor of San Francisco, is the course of any one vessel identical in its tracings with that of another? The course of a ship is not more variable than that of human life, the experience of all utilized by the several, that of the several by all.

No monopoly can be made of medicine. When satisfactory results are professed to have been obtained by any practitioner, or any person, there can be no law appealed to for the purpose of obstructing investigation and excluding evidence. The San Francisco Medical Society did little to advance its claims to be a scientific body, when it scornfully refused, on invitation, to investigate 40 or 50 cases of cancer which it was claimed in the most positive and defiant manner had been cured. The truth should have been brought home, or quackery unearthed, in consideration of common responsibility and common dignity. A flimsy pretext of "medical ethics" can never serve as an apology among men of scientific temper for self-complacent ignorance; no shackles are sufficiently strong to prevent investigation. If a golden grain of truth be discovered, they are glad to exclaim "Eureka!" If falsehood, quackery, deception and ignorance are developed, the true medical profession honors and vindicates itself, and in every way the public is protected. Among the great philosophical medical inquirers of the world, the sole questions are: What is the matter? What will best cure, or relieve, the difficulty? This is the only haven of rest.

Water vs. Whisky.

EDITORS PRESS:—Water is the natural drink for man, and may always be taken in moderation when thirst is present. It performs important purposes in the animal economy, and is absolutely indispensable to life and health. Water is the only fluid which does not possess irritating, or at least stimulating, qualities, and in proportion as we rise from table beer to ardent spirits, in the same ratio we educate the stomach and bowels for that state of morbid sensibility which must eventually weaken the digestive organs in such a manner that they cannot perform their respective functions, and indigestion and dyspepsia is the consequence. If we would enjoy health, all stimulants should be avoided as common drinks. They may be useful as medicines, when nature falters and droops and cannot resuscitate herself; but as a beverage, stimulating drinks should be avoided. When stimulants are taken, the machinery of the system is hurried and driven too fast, and although by this means its activity and power

may seem to be increased, yet a reaction must follow, and a corresponding debility must ensue, then another stimulating draught is called for to bring the system up again, when another reaction must follow. By this course the natural vigor of the constitution becomes gradually and oftentimes imperceptibly impaired. Hence, if we would preserve a healthy system instead of provoking nature to unnatural action, we must furnish her with sufficient healthy nourishment, and let her regulate her own mode and speed of action. Give her nourishment and she will furnish her own stimulants, which will be far preferable to any promptings which art can invent, sustain her in her natural action, and not force her to unnatural speed, which is weakening to her innate powers. To live naturally is to live healthily; to live artificially, is to tempt and foster disease. By stimulating, the nerves are excited, and, in due time, become so irritated as to set up an habitual state of morbid sensibility. From too frequent potations of spirituous liquors the appetite and powers of digestion are extinguished and the stomach irritated in proportion as the inebriate takes his libation the more frequent, till even the presence of food cannot be borne without pain, and a very small quantity of the burning fluid which he used to swallow so freely and with so much gusto, now quickly makes him inebriated. These are facts, and facts are stubborn truths which we see every day, and whoever has watched the dram-drinker's progress will bear me out and support the position I have taken. The too frequent use of ardent spirits stupefies the mind, blunts the mental faculties, weakens the nervous system, destroys our finer feelings, and makes us less sensitive. Injuring our appetite, it makes us irritable, lowers us in the estimation of our friends; we lose our self-respect; it reddens the eyes, it bloats the face, it saps the foundation of health, it weakens our physical strength, it cools the ardor of our attachments, it alienates our affections, and lastly it tumbles us into the ditch, and degrades us below the brute creation.

I find by the reports made to the authorities, in many cities, that there is a wonderful increase in an important branch of manufacturing. In these factories are made a great variety of articles for several classes of society, from the genteel dandy tippler to the beastly drunkard, from the brainless stripling, with his first cigar and julep, to the aged veteran, in filth and rum. Here the green puppy (pardon the expression) is prepared to squander his father's frugal earnings; here are made broken hearts of wives and daughters; here are ruined the hopes of fathers and the stay of mothers; here are prepared men for the prison and the gallows; here is donned our taxation, and our homes are filled with poverty and shame; here votes are manufactured for demagogues to buy; here are made gamblers, thieves, rowdies, loafers, idlers, drunkards, vagabonds, grief, despair, suicide, and murder. In those factories are made rags, ignorance, and starvation for our children, shame and sorrow for our friends, and beasts of ourselves. **LESTER CROSS.**

Stockton, Feb., 1887.

USEFUL INFORMATION.

Fuel From Cornstalks, Grass, Etc.

A citizen of Pocahontas, Ia., has invented a new fuel which bids fair to take the place of coal in the prairie countries. He grinds cornstalks and coarse prairie grass together and moistens them. This pulp is pressed into blocks about 12 inches long and 4 inches thick, and dried. One block will give an hour's steady heat. This fuel can be produced for \$2 a ton, and the inventor claims that it will last twice as long as the best soft coal. Another kind of

An Oil Fuel Block

Is now being made in Philadelphia, which is termed the Standard Fuel Block—a most ingenious method of utilizing oil as fuel. The fuel block is composed of fire-brick and other absorbent materials; is some nine inches long by three wide, weighs four pounds and has absorbent power sufficient to absorb about one-twelfth of a gallon of oil. These blocks are placed in the ordinary combustion chamber of furnaces, ranges, gates, etc., requiring no change in construction. The block retains the oil from a month to six weeks without evaporation. The advantages of the block for burning oil will be apparent at once. It gives a quick, hot fire. The oil is, by its absorption, put in a form that it can be fed into the grates without spraying or any change in the construction of the furnace or in the method of firing. There is no residuum, no ashes, no clinkers, no litter and no danger. It is especially desirable for summer use, and as a fuel for house-roofers and outdoor heating purposes it has no equal. It is said to be especially desirable for steam, fire, and stationary engines, on account of the quick, convenient, and intense heat produced.

AN ALLOY which will solder glass, porcelain, and metals, or one to the other, can be made in the following manner: Copper dust made by precipitating the metal from a solution of bluestone by means of zinc, is to be put into a mortar and treated with a strong sulphuric acid. To this mass formed by the copper and acid, is added a little more than twice as much mercury, the addition being made with constant stirring. The amalgam thus formed is washed

with warm water to remove the acid, and is afterward cooled. When required for use it is heated, and worked in a mortar until it becomes as soft as wax, and in this state it will cling tenaciously to any surface to which it may be applied. It is applicable more especially to those substances which will not bear a high temperature.

CANINE SCENT.—Careful experiments on the sense of smell in dogs have been made by Geo. J. Romans, who has communicated the results to the Linnean Society, of London. He finds that not only the feet but the whole body of a man exhales a peculiar or individual odor which a dog can recognize as that of his master amid a crowd of other persons; that the individual quality of this odor can be recognized at great distances to windward, or in calm weather at great distances in any direction; and that even powerful perfumes may not overcome this odor. Yet a single sheet of brown paper, when stepped upon instead of the ground and afterward removed, was sufficient to prevent Mr. Romanes' dog from following his trail.

A PERENNIAL WONDER.—From time to time are reported supposed extraordinary and unparalleled cases of change in the color of the human skin—whites turning black and blacks turning white—and it may be worth noticing that this striking affection is by no means a new or very rare one. The disease is called leucoderma, and it is well known among whites, though apparently more frequent in the dark-skinned races. Erasmus Wilson gave its frequency in London as not less than one in 400 cases of skin disease; and, according to Kaposi, it is in Vienna one in 500; but Garden, in India, met with one in 362 cases of skin disease, and Bombay inquiries into leprosy disclosed a great number of these cases.

A DIAMOND TEST.—If you doubt your diamond, do not either try to burn it or to break it. You may test it with black mastic, to which, if it be real, it will adhere closely. You may even, if your ears be sharp, rub two together, and mark the indescribable grating, creaking sound—*le bruit strident*—they give out; so do the officers of the Junta Diamantina in the Brazils with the doubtful stones; and lastly, you may try its refractive power, for, unlike all other crystals, the diamond has no double refraction—that is to say, objects looked at through the diamond remain objects still, and are not doubled.—*Cornhill Magazine*.

SALT FROM SALT LAKE.—A member of the Utah Geological Survey says Salt Lake will be of great value in the near future, not only on account of the common salt it will produce, but also for the sodium sulphate it contains. The latter is separated in a flocculent precipitate by the cold weather of midwinter, and annually thrown up on the shore in enormous quantities. There are many other lakes in the far West, whence an inexhaustible supply of the alkalies may be obtained at a small cost. Mono lake, Cal., alone being estimated to hold over 78,000,000 tons of sodium carbonate.

BEER MORE DANGEROUS THAN WHISKY.—That is the verdict of the *Scientific American*, which sets forth that the use of beer is found to produce a species of degeneration of all the organs; profound and fatty deposits, diminished circulation, condition of congestion and perversion of functional activities, local inflammations of both the liver and kidneys are constantly present. A slight injury, a severe cold, or a shock of the body or mind, will commonly provoke acute disease, ending fatally in a beer-drinker.

A NOVEL STOVE.—Mr. John Brierly, Newark, Ohio, has patented an open fireplace heater and stove. It is said to be the first combination of the kind. Any kind of fuel can be used in it. The principle is the bringing of cold air from outdoors by a conducting pipe under the floor, and which is circulated between the body of the stove and the outside jacket. After this the air is taken through the two sides of the stove in another pipe which passes through the fire-chamber of the stove and through the top into the room.

OSOKERITE AND NATURAL GAS IN EGYPT.—A Cairo telegram states that at the petroleum boring No. 1 at Jemshah, the workmen found, at a depth of 365 feet, ozokerite, a mineral wax, much more valuable than petroleum. Now, at 380 feet, they have reached a close-grained coral. Gas and oil are becoming more plentiful. In No. 2 boring at Jemshah, slight traces of gas and oil have been found. In No. 3, at a depth of 155 feet, a coral clay has been reached. In the boring at Zeiti, at a depth of 400 feet, hard coral was touched.

SOFT SOAP with half its weight in pearlsh, one ounce of mixture in about one gallon of boiling water, is in every-day use in most engineers' shops in the drip pans used for turning long articles bright in wrought iron and steel. The work, though constantly moist, does not rust, and bright nuts are immersed in it for days till wanted, and retain their polish.

FLEXIBLE GLASS.—Paper of proper thickness is rendered transparent by soaking in copal varnish. When dry, it is polished, rubbed with pumice stone, and a layer of soluble glass is applied and rubbed with salt. It is stated that the surface is as perfect as glass.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MISCELLANEOUS.—Amador Ledger, March 12: Messrs. A. H. Rose and Poudstone talk of soon starting work on the Rose mine, south of the Mechanics, about a mile east of Sutter creek. The Plymouth Consolidated Mining Co., of California, paid March 5th, dividend No. 45, of 25 cents a share, or \$25,000, making \$75,000 paid this year, and \$1,925,000 paid to date. A cleanup was made recently at M. M. Culbert's mill on Rancheria creek, near Quartz mountain. The yield did not come up to expectations. It is still ruoning, however, with the owners doing oearly all the work. V. P. Yelmini has been engaged for a year past to working the dump pile at the Oneida mine. He keeps 10 stamps running, crushing from 10 to 12 tons per day. The yield is small, but it pays something over expenses. There is still a large quantity to be worked.

PLYMOUTH.—The machinery is being placed for the additional 40 stamps to the Pacific mill. Most of the carpenters have been discharged. The Cupps mine is said to be looking remarkably well.

VALPARAISO.—Ledger, March 2: Some exceedingly rich rock was taken out of this mine on Thursday of last week. Samples show free gold in abundance. It is the same character of black metal which has been met with in the Mammoth big tunnel and other properties at Middle Bar. It is by far the richest ore that has been extracted from the Valparaiso, and is considered by many to be the most important minig development yet made in this champion pocket district of the county. Its importance will be readily understood from the following facts: The Valparaiso joins the Mammoth on the north. The upper tunnel of the latter mine has been run close up to the northern boundary line, and it was at the end of this tunnel where the heaviest deposit of gold-bearing metal was encountered. The tunnel of the Valparaiso was started at a point over 1000 feet from the south boundary of the claim. After running south for 500 feet it first came in contact with the vein matter identical with the seam met with in the Mammoth. This ore vein lies between the granite and slate, and the tunnel has been pushed ahead, all the time following the course of the granite, leaving the golden seam untouched, except occasionally breaking into it to ascertain whether it maintained its size and quality. Since first striking ore, the tunnel has been extended over 200 feet, the ore not only continuing all the way, but also showing steady improvement. There still remains a stretch of fully 500 feet between the end of the Valparaiso tunnel to the dividing line of the Mammoth and Valparaiso ground, and inasmuch as the rich seam is known to exist at the end of each tunnel, it is a reasonable assumption that it extends through the intervening unexplored ground. From this standpoint the Valparaiso promises to be the most valuable mine in that vicinity. The workmen are running the tunnel under agreement for a certain interest in the property. They are not running it for the purpose of extracting gold; their contract requires them to carry the tunnel to the north line of the Mammoth. When this is done, we look for some extraordinary finds of gold.

Calaveras.

THE CONCENTRATOR GRAVEL MINE.—Calaveras Chronicle, March 12: The mill on the Concentrator gravel mine was started up the first of the week. Extensive prospecting operations have been carried on in this mine, resulting in the discovery of a valuable piece of mining property. It had been worked in early times and paid handsomely, but as the work extended into the hill a mistaken idea prevailed regarding the course of the channel. The result was that the parties got off the lead and finally abandoned the claim. Four or five years ago the old works were again opened by parties, among them the present superintendent, Mr. C. M. Burleson. Explorations were then continued for a time and again abandoned. However, Mr. Burleson still clung to the belief that an extensive adit and payoff deposit existed and could be found. Acting under that firm opinion, other parties were induced to take hold of the property, and about eight months ago work was resumed and with gratifying results. There are two distinct leads or deposits; the lower is composed of what is known as "blue gravel," and the gravel of the upper deposit is of a whitish character. The main tunnel on the blue lead extends a distance of 1000 feet through gravel. Nine hundred feet from the entrance a crosscut was run on each side of the main tunnel which proved the channel to be at least 200 feet in width, and averaging 5½ feet in height of pay gravel. The upper deposit is about 90 feet above the lower, and upon this lead a tunnel of 500 feet in length has been run. This stratum is fully 350 feet in width, the gravel paying from the bedrock to a height of 12 to 15 feet. Both tunnels will be worked at the same time. A chute will be constructed from the mouth of the upper tunnel to that of the lower, where the gravel will dump into a car and be taken to the mill. A fine 10-stamp mill has just been completed and started crushing gravel. It is without question one of the best put-up gravel mills in the country. The framework could not be improved for solidity and finish. The mill has ten stamps of 750 pounds each, which are fed by two Hendy Challenge feeders, and all the latest and best improvements to mill machinery for that character of work was obtained. There is a gravel bin with a double set of grizzlies, and capacity of 150 tons. Twenty inches of water propel a Donnelly six-foot hurdygurdy wheel under a pressure of 250 feet. There is quite a large reservoir on the hill above the claim which is kept full from the Mokelumne and Campo Seco Water Co.'s canal for mill purposes.

WEST POINT.—Cor. Calaveras Chronicle, March 12: This locality, which has so long been neglected, is now looming up into quite a lively camp, and its future promises an excellent gold-producing record, as the present bonanzas show an increase instead of diminution. For many years previous to the present boom this district was condemned by outsiders to a degree that retarded the development of our mineral resources. Failures have resulted from

worthless seams having been prospected to the utter neglect of the valuable mines that are found here, of which two are now being worked and paying dividends, and the rest will be worked during the coming summer. It was not till late years that a few of the first-class mines were opened in a systematic manner, and are now proving their great worth and capacity of disbursing dividends to the stockholders. The amount of bullion yield over expenses being taken out of the leading mines here is sufficient evidence to convince the most incredulous mind as to their value. The daily output of ore, the size of ledge in shafts, levels, and stopes, when in favorable condition as may be found now, is a very encouraging outlook for our camp and a prosperous era is the near future is assured.

SMELTER.—There is strong talk being circulated, from a reliable source, that a 20-ton smelter will be erected by the Scorpion Co. during next summer.

Fresno.

HILDRETH NEWS.—Fice Gold Miner, March 11: Through the able management of Bob Brownell, at the Last Chance mill, the working of the ore is a success. Before the concentrators were added to the mill it was supposed that some foreign metal existed that caused most of the fine and part of the coarse gold to run off the plates, preventing the "quick" from amalgamating; but such has been proved to be false. The trouble has been the want of experience and knowledge in milling the ore. The Last Chance mine has been on the market for a year without succeeding to get a buyer at \$30,000. Since the owners started to drive in the lower tunnel to demonstrate the depth of the ledge, which taps the ore body in the upper or No. 1 tunnel 450 feet (No. 1 tunnel showing up ore averaging \$45 per ton, and lots of it), the mine to-day can't be bought for less than \$125,000. During the last six months, James Ryan has been the lucky prospector of this section. Commencing with the late deal on the Comstock lode and the latest event in becoming a one-fourth owner in a quartz ledge found by a tenderfoot, D. J. Hatch took the notion that he could find a mine cropping at the surface; and, sure enough, it has proven true. It is a good prospect, and may, in time, open up and develop into a mine. The ledge is located as an extension of the Jessie Morrow mine, distant about a quarter of a mile north-east of Hildreth. The ledge, including ledge matter between walls, is two feet, that shows plenty of free gold. A shaft is being sunk upon the ledge. The owners are James Ryan, D. J. Hatch, Thomas Keefe and Co., Sullivan, Jos. Carroll and Davis have relocated the Ophir claim with the intention of sinking a shaft upon the surface croppings of an 18-inch ledge, that prospects very well. Robinson & Clark have struck a good body of ore in their intermediate shaft in the lower tunnel, under the table mountain. The prospect is known as the Big Bonanza, and at present the prospect does not belie the name. The people of Hildreth are excited over the late discovery of rich ore in the Hildreth mine. During the last 10 days, the superintendent, W. D. Wallis, has opened up in the second east drift a ledge that contains ore which is beyond calculation, and while taking up the ledge in the east intermediate winze or shaft a two-foot ledge was discovered that is alive with wire gold, and to put it at the lowest calculation, it will mill \$100 per ton, while the sulphurets average \$450 per ton. The ledge in the east drift at the White Rock is improving upon development. The ore seems to hold its own in mineral. The McNally Company made their shipment of bullion of about \$12,000 last Thursday. The ledge is all of the east drifts looks well. The Cascade during the week has been drifted 10 feet further in the tunnel, showing good sulphurets ore. The owners have been opening ground for a new shaft upon the croppings of a ledge lately discovered on the claim. The Rough and Ready mine is producing some good ore, in developing which the percentage of sulphurets increases, being worth \$380 per ton. Wm. Ryan and Ned Poniten's late find has turned out to be a well-defined ledge that carries about 20 cents to the pan in coarse gold. The Zebra is fast developing into the best minig proposition west of Fine Gold river. In its two-foot ledge a streak runs through the ore that is decomposed and very rich, being about eight inches thick and running the entire length of the tunnel. The shaft of the Wilson property will soon be at a depth of 100 feet. At 95 feet the ledge is a little over two feet between the foot and hangings, containing ore, according to arastra returns, that will mill \$50 per ton, with sulphurets that are worth \$450 per ton.

Inyo.

A GOOD CHANCE FOR FORTUNES.—Inyo Independent, March 12: Parties who had never before been up on the Inyo mountains went to the summit east of Independence at the beginning of the week. In the higher regions they everywhere saw abundant evidence of the presence of much silver and lead ores. There need not be any doubt that the Inyo mountains offer as good a field for prospectors as any other region in the world. For a distance of more than 100 miles this range gives plenty of evidence of containing many valuable mines, and at no part need the prospector be more than about ten miles distant from a railroad; at many places there is good evidence of valuable ores with half that distance to the railroad, or even less. All along the mountains there is oow an abundance of rich bunch grass, affording fine feed for animals.

WHITE HILL MINES.—Last Wednesday Dick Whittaker came down from the White Hill. He brought good reports from all the mines up on the hill. Himself and partners are taking out good ore right along from the mine leased from Barnes & Keboe. Dick lately found a new prospect about half a mile distant from the old White Hill mine. He brought samples of the ore to town. The pieces are beautiful cubes of galena ore, carrying about 82 ounces silver per ton and 73 per cent lead. This promises to be as good a claim as any on the hill. Pat Keyes and Pat Downs are very lucky in their claim; they have a fine vein and are taking out good ore right along.

SODA EXTRACTION.—Up till the present time a large force of men and horses has been kept at work at Owens lake, making pools or ground tanks for the evaporation of the lake water. It is said that as many of these tanks are now ready for use as will be wanted for some time, and that the working force will be reduced to what is needed to attend the pumping machinery and keep the tanks filled. An

other experiment is about to be made in evaporating the water. An evaporator the length of a flat car has been set to the lake, and this will be tried in comparison with the ground tanks.

FINE GOLD.—A small ruo of ore was completed at the Maxim mill last Wednesday. The ore was from the Arastra mine and another claim near Chrysopolis. From 28½ tons of ore 27½ ounces of gold was taken; the gold was remarkably fine, being worth 19 dollars per ounce. Total value of the cleanup, \$521; average value of ore per ton, \$18. Part of the lot was very poor ore; so that the part that paid anything was of much greater value than the average.

A GOOD FLUX.—Recently some refuse marble from the Owecos valley marble quarry was shipped to Reno, to be tried as a flux in the furnace at the new reduction works. It was found to answer the purpose admirably, and will doubtless continue to be used in future.

SAN CARLOS.—Hoole & Shaw are going ahead prospecting the San Carlos mine. This is a good mine to prospect; the men are making wages right along. A carload of ore was shipped away this morning; it is of better quality than any before taken out of the mine, and the mine is looking better than ever before.

Nevada.

CENTENNIAL GRAVEL MINE.—Grass Valley Union, March 12: Work will be resumed at the Centennial gravel mine, Washington Township, as soon as the snow goes off. The property is owned at Virginia City, Nev., the company having done a large amount of prospecting, and having now everything in good shape to work the mine systematically. The prospects were excellent last fall when work was suspended for the winter season.

LONE STAR.—Nevada Transcript, March 15: The Jones Brothers & Co., at the Lone Star mine, which lies between the Hussey and Buckeye claims at Willow Valley, have for the past three weeks been running their tunnel on a three-foot ledge. Several crushings were taken out some years ago and paid fairly well in free gold. The indications are that this will prove to be a valuable property when thoroughly developed. S. N. Stranahan is steadily pushing ahead the tunnel from Selby Flat that is intended to tap the continuation of the gravel channel on which are situated the famous old Live Oak and Nebraska claims. With good luck he expects to strike the deposit before many more months have elapsed.

Placer.

IOWA HILL.—Placer Argus, March 16: It is reported that the Morning Star mine near Iowa Hill is yielding some very rich gravel. Elliot West now has charge of the practical work of the mine, though Mr. Pascoe continues to exercise a general supervision and continues to act also as secretary of the company. Hydraulic mining seems to be dead, but the drift mines are still working. Hard rock has been struck on the McIntire mine. The Sucker Flat mine, which was sold to the Goldeo River Co. a year or two ago, is only keeping the water out of the works. The Morning Star is steadily increasing the working force.

San Bernardino.

A NEW SIXTY-STAMP MILL.—Calico Print, March 12: The Oro Grande Mining Co. commenced the erection of a 60-stamp quartz mill near their present 15-stamp mill near Daggett. It will cost \$250,000, and it will take six months to complete it. Thirty men are employed in grading the foundation. There is enough ore on the dumps of the Waterloo mine to keep 30 stamps in operation for months, and the remaining 45 stamps of the two mills will be utilized in reducing ore from the King, Burning Moscow and other mines of the company. When the mill is completed and more men put to work in the mines, Calico will again experience the lively times of several years ago. Wilson Waddingham, of the Bonanza King Co., of Providence, is one of the stockholders in the scheme to put up a smelter at San Diego, so it is reported.

Shasta.

NOTES.—Redding Free Press, March 12: Mr. Riley, who purchased the Central mine for \$35,000, is having 40 tons of ore worked by C. E. De Forest. The rock purchased from Bell, Hopping & Co. is, we understand, very rich. The sulphurets from Iron mountain are being shipped to Denver, Colorado. Two more roasters are to be added, which will increase the capacity to 15 tons every 24 hours. Geo. H. Chick went to San Francisco last Sunday, to superintend the shipping of the new machinery required for increasing the capacity of the new reduction works, the last piece of which is now on the way. He returned on Thursday. Luke McDonald escorted several mining capitalists up from San Francisco last week, and French Gulch and Deadwood claimed their attention for a few days; he returned with them last Sunday, accompanied by Henry Martin, of the Brown Bear Company. Report says that the McDonald brothers value their mine at \$400,000, and they are not hunting a buyer at that.

Sierra.

ALASKA.—North San Juan Times, March 11: News comes from Pike City to the effect that the Alaska mine is turning out rock that pays \$100 to the ton, and that there are hundreds of tons of such rock in sight. It is now said that the Alaska Company would like to be released from their bond.

Siskiyou.

SCOTT BAR.—Yreka Union, March 12: Charles Ingram struck good prospects in his claim last week, finding one "color" weighing 8 ounces and several smaller ones. He is working the old Bueler mine.

PICK AND PAN.—Something like 600 tons of good ore from the Black Bear mine has been hauled to the company's mill. Crushing will commence in two weeks if the weather will permit. Prospectors will do well to devote their energies toward unearthing lodes, as most of the placer ground has been pretty thoroughly prospected. Veio mining will be the future industry of the county. The mines on McAdams creek are all shut down on account of the snow and cold weather, but it will not be long until active operations will be resumed in this extensive and rich mining region. At Oro Fino work was to have commenced this week in the rich hydraulic mines owned by Wright & Fletcher and the brothers

Eastlick. These are among the largest and best paying mines in the county. The hydraulic mines at Hawkinsville were started up last week. The Big Ditch furnishes an unusually large quantity of water, and the season will probably extend a month longer than last year, when these same claims were worked with profit. The never-failing Montezuma mine, on the south fork of Scott river, just above Callahan, is to be worked on an extensive scale again this season. J. B. Parker will superintend the work. We hear that the Fortune will be run this season, but very little work will be done on the Last Chance. Wing-dam mining on the Klamath river will be set back several weeks later this season than usual on account of heavy snow at the head of its tributaries. The body of water will not reach the low-water mark for some time to come. The miners will improve their time now by getting out material for dams. It is estimated that over \$75,000 will be taken from Hon. R. H. Campbell's Quartz Valley mine this season. This property yielded over \$40,000 last year under very unfavorable circumstances. With the surety of an abundance of water this season, and considering the richness of the ground to be worked, we believe the estimate to be too low. In regions where the snow has disappeared, considerable prospecting is being performed. Cabins on the mountains and in the gulches, which have been vacant for years, are now occupied by strange prospectors who have reached here since railroad communication has been established. Several experts arrived from below last month, but departed again with the intention of returning when the snow disappeared. Good reports come from the mines in the vicinity of Scott Bar. A. Milne is working his old mine on Graveyard Hill with success. The Quartz Hill Co. is running two giants and expects big pay. Walter Borland and Henry Preckel are working their respective claims and will do well this season. No new developments in quartz.

Tuolumne.

GOLD.—Cor. Tuolumne Independent, March 12: Gold is being found all along the line of this fissure. North and south there are parties vigorously prospecting—sinking and tunneling. It is expected that there will be shortly other bonanzas on this line of veins. I heard of a strike having been made in the past few days, south, in Rollierie's ground. I will give a statement next week. I hear there are several parties on Austrian Hill (Bald Mountain) taking out heavy gold. The old Kaiser struck about \$12,000 last week. It is rumored that they have taken out 25 pounds since. This mine will, in the near future, produce largely—as the owners will hydraulic off the vein (it being shattered by a slide), water being readily available. The result is a foregone conclusion, as it is a well-known exceedingly rich vein. If the amount of gold coming out of Tuolumne county could be arrived at, it would show considerably ahead of any other county in the State. The Buchanan mine, at lowest level, is showing splendidly—turning out bullion regularly. From its 20-stamp mill large yields prevail. The Quartz Mountain mine is working with 25 stamps, satisfactorily. The Star G. Mining Co. at Rose creek, under the able superintendency of G. F. McPherson, is being put into good working order. There is a 12-foot vein uncovered, which assays into the hundreds. There are several other veins on this fine property that are exceedingly rich. This is a fine section of the county and will produce a vast amount of gold when the mills are built. The Black Oak mine, Soulsbyville, struck very rich gold last week, showing galena, zinc blende, and coarse and fine gold all mixed together. The vein is from 1 to 2½ feet, and found 150 feet from the surface. The ore is as rich in quality as the ore the old famous Soulsby used to extract in palmy days. The Live Oak, Churchill, and Wheel Perrin mines are on the same lode, and are valuable properties. The Riverside mine has at last struck the "shoot" in the low level tunnel. We hear the rock is of high grade. The San Guiseppe struck rich gold a few days since.

THE BONANZA YIELDS AGAIN.—Union Democrat, March 12: The Bonanza mine at Sonora, like the Mauna Loa volcano of the Sandwich islands, has made another eruption, not of burning lava, but of shining gold to add to the material wealth of the country. This famed mine yielded its hundreds of thousands of dollars of golden wealth a few years since. For a time it lay idle, then work was again prosecuted and a drain tunnel run into it. Once more the express company and the mint have greeted gold in quantity taken from the Bonanza mine of Sonora. The last miners working were A. P. Johnson and David R. Oliver; a few days ago they drove their picks into a pocket and developed from \$50,000 to \$60,000. The mine is owned by James G. Divoll; Oliver and Johnson worked under a lease for a certain share. The yield was divided between Divoll, Johnson, Oliver and John P. Dart, the mining surveyor and engineer. Notwithstanding the mine has yielded so largely, it is the belief of miners that it yet contains untold thousands of wealth. More than 30 years ago it paid various parties what was called big in those early years of quartz mining. It has had its ups and downs, its owners at times getting rich and other owners failing to succeed. As long as the hill remains it will hide gold which can be had only by persistent hunting. There is a large strata of veins running through it, carrying gold oftentimes in very large quantities. The days of the Bonanza have not passed; at some time it will give its riches in as great profusioo as it had in the past.

Trinity.

THE VENICIA MINE.—Journal, March 12: From Mr. St. Auburn, superintendent of the Venicia mine, Eastman district, we learn that work on the new mill is being pushed as rapidly as possible. All of the machinery has been hauled to the mill-site, except one load, and that will be on the ground within a week. The difficulty of procuring lumber at this time of year has been quite a drawback, but Mr. Jumper will get a supply in as soon as it can be transported. Timber is being hewn for the frame of the mill, and its place of location has already been nicely graded. The mill, on its completion, will be able to do considerable custom work and thus will be of great benefit in affording a practical working test of the value of the numerous ledges owned by other parties in its vicinity. In addition to the above, Mr. St. Auburn is also running a tunnel from the east side of the mountain to tap the ledge at a depth of 300 feet. The probable length

of the tunnel will be about 700 feet. Work is being pushed with three shifts, and the mine will soon be well opened and in good running order. On the whole, the outlook is very favorable for a prosperous season in that quarter.

THE BRUNSWICK MINE.—Work has been resumed on the Brunswick mine, Mr. W. F. Arnold having taken charge of the property. This mine is located near some of the most valuable mines in Deadwood district, and indications point to a good ledge.

NEVADA.

Washoe District.

Savage.—*Virginia Enterprise*, March 12: The north drift on the 1200 level, from the Hale and Norcross side, is into Savage ground a distance of 80 feet. The last 20 feet of this drift is in quartz, carrying some good ore. The drift is running nearly parallel with the ore streak, and has not yet much cut into it. In a day or two a west crosscut will be started, the deposit cut across and its width ascertained. The 800-foot station at the Curtis shaft has been completed. Waste rock is now being hoisted up this shaft, but the ore is still hoisted at the Bonner shaft of the Gould and Curry. As soon as the sidetrack from the Virginia & Truckee railroad is completed to the dump of the Curtis shaft, the ore will be hoisted at that point—will no longer be sent out to the Bonner. On the 800 level, they are now driving south from No. 3 west crosscut. The quartz shows some good assays, some spots showing some very good ore.

Iowa.—*Tunnel A*—The face is still in vein matter. The air has become foul and only one shift—at night—is now worked. Have commenced sinking an air shaft from the surface to connect with this tunnel for ventilation. This shaft is started on the middle lode croppings, which prospect well in gold, and will be continued down on the lode to connection with the tunnel. The large ledge discovered on the surface last week is being opened and traced in length at other points and prospects well in all openings. This ledge has been struck in B tunnel fully 25 feet wide, lying on a heavy footwall clay, considerably broken when cut, but all the quartz in the lode gives fair "horn" prospects of gold.

CON. CALIFORNIA AND VIRGINIA.—West crosscut No. 1, on the 1300 level, is out 584 feet. The face still shows low-grade quartz. The usual progress has been made in No. 1 crosscut east on this level. Good headway is making in the work of cutting out the station for No. 1 winze on the 1400 level. This winze is at a point in the main south drift 110 feet south from where it connects with the C. and C. shaft drift. Upraise No. 2 from the south drift still continues in good milling ore. Are still extracting ore from winze No. 2 on the 1405 level, 165 feet south of the Ophir line. The ore-producing sections are yielding the usual amount of good milling ore.

Hale and Norcross.—On the 1200 level a west crosscut is being driven jointly with the Savage near the north line of the Norcross ground. The crosscut is now in about 130 feet, with vein material of a favorable appearance in the face. On the 1200 level a drift is being driven south; also are driving south on the 1300 level. No crosscuts have yet been made from these drifts, but every 100 feet timbers are being put in preparatory to starting crosscuts at 00 distant day. On the fifth station (1100 level) a crosscut is being run to the west, the face of which is now in a mixture of quartz and clay of a promising appearance.

Potosi.—On the 250 level the drift south from the Chollar line is 365 feet in length. Its face is still in a favorable vein formation. Timbers are put in as the drift progresses, from which crosscuts will presently be started. The drifts and other openings in the mine at several points are filled with ore. This ore will probably lie where it is until a new mill is erected here in the city. Work on this new mill will be commenced just as soon as all danger of storms is thought to be over. The mill will work the ore of both Potosi and Chollar.

MEXICAN.—On the 1300 level the joint Union and Mexican drift, which has been turned in a northeasterly direction to follow the trend of the vein, was extended 34 feet; total length, 570 feet. This drift is now 317 feet in Mexican ground. The joint Mexican and Ophir east crosscut was extended 28 feet; total length, 244 feet.

CHOLLAR.—The old Chollar shaft is being re timbered and sunk to get down to the head of the old incline, 1000 feet below the surface. It is now down about 900 feet. Work has been resumed on the croppings at the Sharon shaft, where some ore is being taken out; though the dumps are now all full of ore.

JUSTICE.—The south drift on the 200 level is still in a streak of ore which will pay for milling, and several tons are saved daily as the drift progresses. The drift from the bottom of the winze 60 feet below the 350 level is being pushed south in a favorable formation, and stringers indicate that it will soon reach the streak of ore found on the level above.

BALTIMORE.—The west drift from the 500 station is in favorable material, which must lie in the vein, as the east clay—or what was supposed to be such—was cut through some days ago. As soon as the 350 level has been cleaned up, the north drift will be pushed ahead to look for the ore body found on the 225 level.

OPHIR.—On the 1300 level the northwest drift from the Consolidated California and Virginia is into Ophir ground 130 feet, and the drift north from the Consolidated California and Virginia is into Ophir ground 80 feet. The face is still in quartz of low grade.

ANDES.—On the 200 level are taking out some very fair ore. As yet the ore occurs in bunches. Some of the bunches are very rich, while others are of low grade. The average, or mixture, is fair milling ore.

BEST AND BELCHER.—On the 1500 level the northeast drift was advanced 106 feet; total length, 836 feet. This drift is passing through porphyry, clay and quartz, showing value by assay.

YELLOW JACKET.—The usual exploring work is being done in the old upper levels. The ore-producing sections are looking good yielding about as usual. The daily shipments to the Brunswick mill,

Carson river, average 150 tons, which is about the daily capacity of the mill.

ALPHA AND ESCHQUER.—The west crosscut on the 120 level is in Alpha ground. It is progressing rapidly with the face in a favorable formation of quartz, clay and porphyry. The north drift in the Eschquer is in much the same kind of vein material.

GOULD AND CURRY.—On the 425 level the south-east drift from the main south drift was advanced 52 feet; total length, 112 feet. It is showing low-grade quartz.

HAYWOOD.—The shipping of ore from this mine (situated west of Silver City) to the Thompson mill at Devil's Gate, was resumed last Wednesday, and the mill will now be kept in constant operation on ore from the mine.

OCCIDENTAL.—The drifts, crosscuts and upraises from the upper and lower tunnels are making the usual progress, with no new developments to note in any part of the mine. The usual amount of ore is being extracted.

SILVER STAR.—This Silver City mine adjoins the Haywood on the south. Drifts are being run north and south from the main shaft at a depth of 100 feet, and are passing into vein material that shows some free gold.

ALTA.—Still pushing the south drift from the bottom of the winze on the 800 level. The drift is in promising material lying near the wall of the vein. At an early day crosscuts will be run from this drift.

CROWN POINT AND BELCHER.—The turbine wheel of the Santiago mill will be completed and the mill running the first of next week, when work will be resumed in these mines with the usual force of men in each.

SIERRA NEVADA.—No. 2 south lateral drift on the 320 level is now in a little over 400 feet. It is in a vein formation carrying stringers of low-grade quartz, with occasional bunches of the same.

OVERMAN.—Six carloads a day of fair ore are still being taken out from the level of the old Petaluma-street tunnel. This is shipped to the Vivian mill for reduction.

SCORPTION.—On the 300 level are drifting east from the shaft. The average progress made in this drift is 35 feet a week. The drift is passing into soft vein material.

UTAH.—The north drift from the main west drift is out 269 feet. The face still continues in vein material.

BULLION.—An encouraging amount of low-grade quartz is still encountered in the east drift on the 200 level.

SUCCESS.—Good headway is making in the work of retimbering the old shaft.

IMPERIAL.—Repairs to main shaft still in progress.

Lone Mountain District.

ORE.—Belmont *Courier*, March 12: Uncle Billy Koch has several tons of ore from his Lone Mountain mines worked at Reno, and the result was 28 ounces in silver per ton—too little to pay for shipping. With a railroad near there to facilitate the bringing in of supplies cheaply, these base metal mines will be a big thing. The ores are heavy in lead, and will pay to smelt near the mines.

Ophir Canyon District.

PROGRESSING.—Belmont *Courier*, March 12: Work is progressing steadily in the Chicago Mining and Reduction Company's mine in Ophir canyon with the most flattering results. The discovery is opening big and shows fine ore.

Tuscarora District.

TORNADO CONSOLIDATED.—*Times-Review*, March 12: Extended west crosscut 10 feet. We have cut into a vein of fine quartz carrying some sulphurets and giving low assays in gold.

BELLE ISLE.—During the week have started a crosscut east from the 250-foot level. Line crosscut, 150-foot level, has been extended 9 feet; no change in the rock.

NORTH BELLE ISLE.—North gangway, 400-foot level, has been extended 18 feet. The rock is very hard. North drift on east vein from No. 1 winze, 70-foot level, has been extended 19 feet. Vein matter in face broken and irregular.

NAVAGO.—Fair progress has been made with the work on the 350-foot level. South drift from line crosscut, 150-foot level, has been extended 8 feet. The ore being extracted from above the 150-foot level is of lower grade than last week.

NEVADA QUEEN.—Crosscut on the 350-foot level has been advanced 21 feet; total distance 117 feet. There is water showing through the seams in the face. Water has raised in the shaft up to the 200-foot station. Shaft has been retimbered up to the 100-foot level, where a station is being cut out. North gangway, 200-foot level, has been extended 14 feet, all of which has to be timbered. Quite a flow of water is coming from this gangway. West drift is in 85 feet, 20 feet being made during the week.

Union District.

WORK COMMENCED.—Belmont *Courier*, March 12: Work has been commenced on the Berlin mine, Berlin canyon, Union mining district. This is one of the series owned by the Cincinnati Company. They are also working on some of their other mines. The Knickerbocker mill will soon be ready to drop stamps.

White Pine District.

PURCELL.—White Pine *News*, March 5: The Purcell mine on White Pine mountain, which is the property of the Sweetwater Co., is said to be looking well, and that a large quantity of smelting ore is in sight, ready to be taken out as soon as they get things in shape to do so. Wm. Matson has three men and himself at work on the Little Giant mine, just over the Shermantown divide, which Mr. Matson says is looking very promising.

ARIZONA.

TURKEY CREEK.—Prescott *Courier*, March 12: We have to thank Hugh Mulvenon for a specimen of ore from Roach & Mulvenon's mine, Turkey Creek district. A carload of the stuff will be sent in here shortly. Mr. M. says the gold ledge that was recently discovered gives promise of great richness. Messrs. Clark & Adams are running a small mill on Groom creek. Runs have, so far, been

successful, and they may, ere long, add more stamps. The U. S. lode and the Howard, near Prescott, contain ore that is rich enough to ship, and owners should be working them.

ORE.—Mohave *Miner*, March 12: Oliver Bros., of the Prosperity mine, Todd Basin, sent over a couple of tons of ore. J. Upsher had a ton of good ore worked from one of his claims on Stockton hill. Sample & Shrope had two lots of ore from the Juno mine sampled during the week. Levy & Co., of Prescott, sent down a carload of ore during the early part of last week. James Wright had a ton of rich ore from a claim at Chloride put through the sampling works. A carload and a half of ore from the Rainbow mine was worked at the sampling works last week. The work of pumping the water out of the Keystone mine, at Mineral park, is going on night and day. Among the receipts of ore during the week, at the sampling works, was a carload shipped by W. N. Kelley, of Prescott. Messrs. Christie & Lawrence sent over 15 tons of ore from the Rural mine, at Mineral park, which went away up in the hundreds as usual. We paid a visit to the sampling works this morning, and found everybody busy sampling seven lots of ore shipped here from Prescott, by Frank Cockburn. J. J. Jerome brought up a couple of tons of ore from the Arnold mine, Cedar district. As this is the first shipment from this mine for some years, we hope it will prove remunerative. Messrs. Hale & Addison have a working bond on the Lone Star mine, at Mineral park, and have already put the hoisting machinery in running order, ready to start up work in earnest on Monday. The branch sampling works now being erected at Prescott, by Foster S. Dennis, will be the most complete affair of the kind in New Mexico and Arizona. Brow & Miller brought in to-day another load of ore, about a ton, from their rich mine in the Weaver district, near El Dorado canyon, and it is safe to say that Mr. Brown will go home to-morrow with a check for \$400 or \$500 in his pocket.

MONTANA.

GOLO.—*Helena Herald*, March 10: John Hardwick, who owns some promising gold quartz leads in the Big Indian district, was displaying some rich specimens from the Bourbon mine in that section, yesterday. They are sprinkled all over with pure gold which is not only visible to the naked eye, but is in such profuse quantities that it could be discerned across the street. John expects some valuable developments in his claims this season.

BULLION.—*Helena Independent*, March 10: Another wave of most excellent good feeling overwhelmed the stockholders of the Jay Gould mine yesterday, and they felt jubilant. The cause was the arrival of two yellow bars at the Montana National bank, comprising the output of the mill for the month of February. The bars were worth a few dollars less than \$17,000, cleaned up from the work of a trifle less than 25 days. Besides this there remains about \$500 of slag in the assay office, and it has taken an amount of bullion estimated at from \$3000 to \$5000 to charge the mill, which amount is not cleaned up but remains in the pans and batteries. As this is the first month the mill has run, succeeding months' outputs will afford a better criterion of the value of the ore and the efficiency of the mill. But \$17,000 of bullion from a 10-stamp mill in 25 days must be regarded as great work.

NOTES.—*Butte Inter-Mountain*, March 9: Clark's Mountain Chief still remains shut down. Dave Upton's Mountain Chief is being actively developed. The West Colusa is working a force of about 20 men, some at the pumps and others prospecting. The Pueblo Sampling and Refining Works are doing considerable business with small mine-owners. The Liquator concentrator has been leased by the Buie Reduction Works and is being run constantly. The Betsy Dahl is being worked by H. C. Dahl. The 200-foot level has been reached and it is stated that some good silver-copper ore has recently been found. This mine is located on the main street of Meaderville. The Matte mine is working a small force, principally developing. About 20 men are employed on the Modoc. It is stated that a large vein of good ore has recently been found in this mine. These two mines are included in the Mountain Consolidated group owned by the Chambers syndicate. Five pumps are kept constantly going on the Colusa. The principal work going on here is developing new levels. About 12 men are working at this mine. The West Colusa and Colusa are the property of the Montana Copper Co., and from a well-informed gentleman we learn that they have a large amount of good copper ore in sight, especially in the Colusa, and that the company is only awaiting sufficient increase in the price of copper, when they will resume operations.

OREGON.

MINING IN BAKER COUNTY.—Bedrock *Democrat*, March 12: The Peabodias Mining Company is operating the extension of the Tom Payne mine with a large force of miners. They have sunk a shaft to the depth of over 70 feet, and a tunnel of over 150 feet is now being run in to tap the shaft. The vein averages over four feet in width, and it is no uncommon thing for large pieces of free gold to be found. The owners of this property are very enthusiastic over their prospects of having a great mine, and intend pushing the work of development as rapidly as possible. If the mine continues showing up satisfactory, a mill will be erected on the property in a few months. The principal owner is Mr. Ed Hardy, of this city. The Tom Payne mine, owned by Hayes, Reynolds & Co. is showing up to be a vast ore body of great richness. On this mine an immense amount of development work has been done, and its owners are now engaged in running tunnels, shafts, etc. All question as to its being a valuable property is settled. The vein is wide, and the ore is exceedingly rich, and of a free-milling nature. The owners of this property are contemplating the erection of a mill, having heretofore worked the ore by arrastra. The Bonanza mine, of Cabot Cove district, will become one of the leading mines of Eastern Oregon. A mill is now in running order on the property. The other many discoveries of this district give promise of rare development. An exodus of miners and prospectors from less promising points to this district is expected in the near future. Placer mining throughout Baker county will soon commence under most favorable auspices. The flow of

water this spring will be equal to every demand. The placers of Mormon Basin and Amelia will soon start up. Messrs. Colt, Beers, Blair and others expect a greater season of mining than for years past. At Auburn, the district where gold was first discovered in Eastern Oregon, in the year 1862, placer mining still continues, though it must be said the richest of the ground is about worked out. Still some of the original locators of the camp who have followed the pursuit of mining for all these 20 odd years, and have been rewarded for their labor by being the possessors of considerable wealth, are loth to believe that there does not yet remain enough of the buried treasure to justify continued labor. Principal among these mine-owners are P. Connor, William Mullen, and Jos. Eyo, who contemplate working their ground from the mouth of French gulch up to the town this season. Also, Charles Duckworth and David Littlefield will soon commence work on French gulch, and their prospects are good for a large yield. The Marysville Mining Co., owner of the great Auburn canal and much valuable placer ground, is now making preparations to commence the season's work at an early day.

QUARTZ AND PLACER.—*Jacksonville Times*, March 11: Quartz miners are getting ready for this season's campaign, having been interfered with by stormy weather. Dean & Huston, of Willow Springs precinct, have piped off a large piece of ground already and are doing quite effective work. J. M. Walsh and others are making preparations to resume quartz mining in Wagner Creek district on a large scale. Miller & Huggins, of Farmer's flat, are running their giant day and night. J. T. Layton, of Applegate, is busily engaged in piping and making excellent progress. Smith & Lynch are making good headway at their placer mines on Wagner creek, having piped off a good-sized piece of ground already. Miners are favored with an abundance of water, with every prospect of its continuance. This will be the best season that they have had for years. The well-known diggings of Saltmarsh & Co., in Sterlingville precinct, are not being worked this season, having recently been purchased by the Sterling Co. Work is going on at the Sterling mine with two pipes and a full head of water. A large amount of snow lies at the head of the ditch and the prospects are favorable for an extended run. The miners of Josephine county are all busily at work, having an abundant supply of water. They will no doubt make a favorable showing—much more so than they have for several years past. The machinery for the Whitman mine, at Pine creek, consists of a 20-stamp mill, 200-horsepower engine, eight Frue vanners, sawmill outfit, wire-rope tramway, incandescent electric light and complete sampling machinery. The entire plant is expected to be in operation by July 1st.

NEW MEXICO.

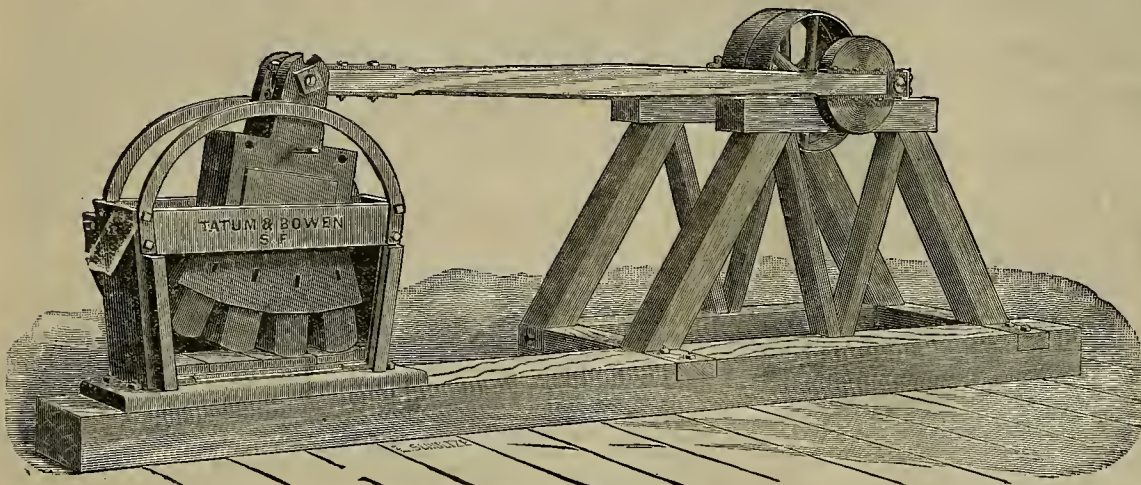
LEACHING PROCESS.—*Chloride Black Range*, March 10: The Black Range Lixiviation Company is exerting every effort to make its works a complete success, and offers fair and reasonable terms to the miners, and is willing to meet them half-way. Now let the miners step to the front and extend the hand of encouragement. In order to set a schedule price for the purchase of ores, the Black Range Lixiviation Company will make a test run of the ores of the range, which is an excellent idea. A practical test run will show them exactly just the ores they can treat, which will be of great benefit to both the company and the mine-owners. Frank Pitcher, assisted by his brother and Mr. Forrest, is busy taking out a carload of fine ore from the St. Cloud mine, and has already 12 tons of first-class ore, which carries plentifully in free gold, on the dump, besides a considerable quantity of second-class ore. The St. Cloud has never made as good a showing as it does to-day. The recent discovery of high-grade ore on this property adds much to the general appearance and value of the mine. The ledge of the St. Cloud is one of the most prominent in the country and shows mineral everywhere, and sufficient development work has been done to prove that there is an endless body of good grade, free-milling ore within its walls, and with an ore-treating establishment close at hand, it will prove a mammoth producer of the precious metal.

UTAH.

REVIEW.—*Salt Lake Tribune*, March 11: The receipts of ore were extremely light for the week ending March 9th, inclusive, being but \$12,143.06; of bullion, \$75,263.37; of both, \$88,406.43. The week before the total receipts were \$171,290.83, of which \$100,620.74 was bullion and \$30,247.67 was ore. The Ontario shipped no bullion during the week, the mill undergoing cleanup and repairs. It sold ore to the value of \$21,930.03. All goes along well with this magnificent property. The Daly shipped during the week seven bars of bullion, 10,278.77 fine ounces, and sold ore to the value of \$8480.61; a total product for the week of \$8,758.78. The base bullion receipts of the week were to the value of \$17,850; fine bars, \$14,351.66; gold bars, \$4335.50. The Hanauer smelter produced during the week bullion to the value of \$16,854. No word has come from Horn Silver during the week, save of very limited operations, under a cautious veil of secrecy. Ore receipts in this city for the week were \$4500 by Wells, Fargo & Co.; \$2610 of Crescent by McCormick & Co.; and \$5033.06 by T. K. Jones & Co.

SNAKE CREEK NEWS.—The Southern Tier Mining Company, F. W. Hayt, manager, has seven men employed doing development work on their property. All parts of the mine opened by recent developments are looking splendidly. The slopes are looking well, and the time is evidently near at hand when the Southern Tier will be placed to stay on the list of Park City's dividend-paying mines. James H. Bowen went over to his Snake Creek properties to-day to put some more men to work on his claims. He has ore on the dumps of several pieces of his ground, pushing on the Rochester group. However, the force of men is at present small. The recent rich strike in the Silver Age tunnel of the Silas Reed group loses none of its interest as a principal theme for conversation in local mining circles. It is expected that the lively development work to be done, on this group will evolve the coming summer in an excellent ore-shipping record.

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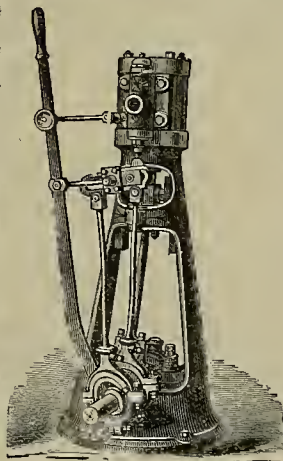
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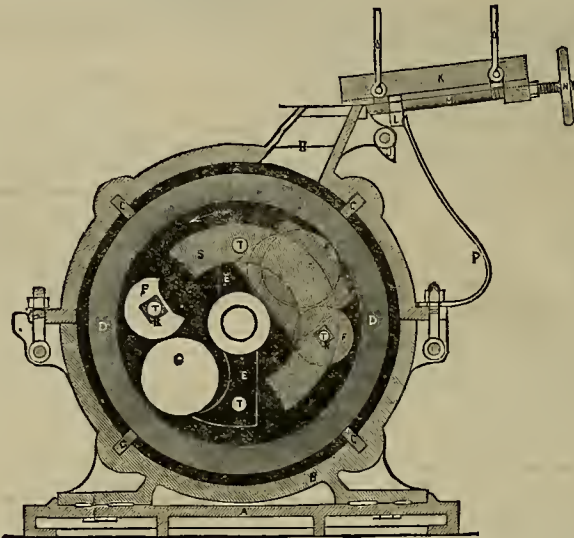
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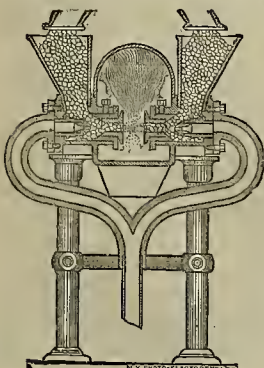
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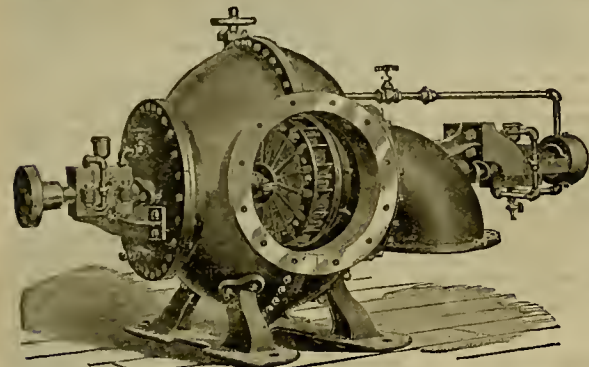
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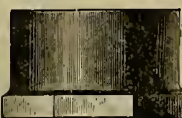
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FOR WEEK ENDING MARCH 8, 1887.

- 359,121.—STATION INDICATOR—G. H. Bade, Austin, Nev.
359,126.—BICYCLE—Jas. Brusie, Oakland, Cal.
359,127.—BICYCLE—Jas. Brusie, Oakland, Cal.
359,139.—HORSE COLLAR—S. B. Davis, Eureka, Cal.
359,208.—PRINTERS' GALLEY—W. W. Gilman, S. F.
359,975.—ELECTRIC BOLT RELEASE—G. L. Henzel, S. F.
359,018.—WHIFFLETREE COUPLING—A. Heuser, Taylor, Nev.
359,155.—AMALGAMATOR—F. A. Huntington, S. F.
359,158.—SAMPLING APPARATUS—Wm. Jones, S. F.
359,159.—STORAGE FLOORS—Wm. Jones, S. F.
359,160.—STEAM ENGINE—Kenworthy, Sexton & Thompson, Colton, Cal.
358,981.—BRIDLE ROD FOR RAILWAYS—J. C. Lane, Sprague, W. T.
359,164.—SULPHUR ATOMIZER—H. L. Lightner, S. F.
359,026.—PENCIL-SHARPENER—A. C. McKinnon, S. F.
359,170.—COPYING PAPER—E. I. Nichols, S. F.
359,096.—CENTRIFUGAL PUMP—J. Richards, S. F.
359,097.—CENTRIFUGAL PUMP—J. Richards, S. F.
359,183.—SASH-FASTENER—E. Sherwood, S. F.
359,041.—SEED-PLANTER—J. W. Van Order, Arlington, Ogn.
359,042.—DRAG-SAW—J. R. Van Winkle, Aberdeen, W. T.
359,043.—CABLE GRIP—Vogel & Whelan, S. F.
359,236.—SPIRIT LEVEL—W. R. Vogt, Oakland, Cal.
359,020.—CONCENTRATOR—C. W. Joy, Atlanta, Idaho.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

New Incorporations.

EVENING STAR M. Co. March 14. Location, Deadmans Flat, Grass Valley district, Nevada Co. (This is the old Seven-Thirty mine.) Capital stock, \$1,250,000. Directors—J. W. Brumagin, E. F. Bean, W. Patterson, George W. Tyler, George Bird, D. B. Lynch, J. P. Desmond.

BULLION, BECK AND CALIFORNIA M. Co. March 14. Location, Tintic district, Utah. Capital stock, \$10,000,000. Directors—George C. Perkins, W. H. Brown, J. A. Fillmore, Cornelius O'Connor and Alex Badlam.

CENTRAL CALIFORNIA LUMBER Co. March 14. Capital stock, \$250,000. Directors—A. J. Turner, J. F. Kennedy, George T. Shaw, A. W. Kennedy and George Lewiston.

GUALALA M. Co. March 12. Location, Mendocino Co. Capital stock, \$100,000. Directors—J. W. Oates, W. H. Barham, John Field, R. W. Warfield and J. C. Cox.

PACIFIC FIRE ASSOCIATION. March 14. Capital stock, \$300,000. Directors—George C. Perkins, Oakland; P. B. Cornwall, Julius Jacobs, A. M. Burns, Aaron A. Adler, S. W. Levy and George Easton.

Mining Share Market.

Mining stocks have not been very active during the past week, and prices have not shown any material advance. All sorts of stories come down from the Comstock, which have more or less temporary effect. There are favorable conditions at the north end and other places along the lode, but nothing substantial of great moment has been developed. The Virginia Enterprise, speaking of Savage, states that on the 800-foot level bunches of good ore are beginning to be found. In ground where ore will not live at all, a big deposit is just as likely to be found as a little bunch the size of a stage-coach. On the 1200 and 1300 levels of the Hale and Norcross there are also in fertile ground. There they have two long south drifts, along which, at every 100 feet, timbers have been put in preparatory to starting crosscuts. It will not be long before two sets of crosscuts will be seen going on in each of these levels. Besides, on the 1100 (fifth station), they now have a west crosscut that is in very promising material that is largely composed of quartz.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Bluebird, March 8, \$25,760; Eureka Co., 15, \$8000; Moulton, 9, \$12,800; Alice, 9, \$12,170; Hanauer, 9, \$2700; Crescent, 9, \$2610; Hanauer, 10, \$2700; Hanauer, 13, \$5420; Jay Gould, 10, \$17,000; Margat Ann, 10, \$11,038; Lexington, 10, \$25,000. Last week Wells, Fargo & Co. received at Salt Lake in bullion \$41,037; McCormick & Co., \$19,464; T. R. Jones & Co., \$5033; and Union Bank \$22,872.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATIONS.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.	
Andes S. M. Co.	Nevada, 31.	25, Jan 24.	Mar 3.	Mar 23.	B. Burris.	309 Montgomery St
Alta S. M. Co.	Nevada, 35.	50, Feb 9.	Mar 18.	Mar 5.	W. H. Watson.	302 Montgomery St
Bodie Con. M. Co.	California, 6.	50, Jan 24.	Feb 28.	Mar 28.	C. W. Sessions.	309 Montgomery St
Benton Con. M. Co.	Nevada, 17.	25, Jan 28.	Mar 21.	Mar 21.	W. H. Watson.	302 Montgomery St
Best & Belcher M. Co.	Nevada, 36.	50, Mar 5.	Apr 15.	May 5.	L. Osborn.	309 Montgomery St
Bodie Tunnel M. Co.	California, 14.	25, Mar 2.	Apr 6.	Apr 27.	C. C. Harvey.	309 California St
Belle Isle M. Co.	Nevada, 10.	25, Feb 9.	Mar 19.	Apr 7.	J. W. Pew.	310 Pine St
Caledonia M. Co.	Nevada, 42.	15, Mar 1.	Apr 5.	Apr 26.	A. S. Gooch.	414 California St
Camp Creek Placer M. Co.	California, 1.	10, Jan 20.	Mar 10.	Apr 14.	G. W. Miller.	306 Pine St
Comstock M. Co.	Nevada, 3.	15, Mar 14.	Apr 18.	May 15.	A. E. Ball.	309 California St
Dolores Con. M. Co.	Nevada, 4.	05, Mar 2.	Apr 11.	Apr 29.	R. N. Van Brunt.	318 Pine St
Four Hills Mine.	California, 1.	25, Jan 22.	Feb 28.	Mar 21.	F. S. Moody.	328 Montgomery St
Golden Fleece Gravel Co.	California, 8.	20,000, Jan 27.	Mar 8.	Mar 21.	W. J. Gleason.	310 Fresno Block
Gover Improvement Co.	California, 2.	10,000, Feb 28.	Apr 5.	Apr 26.	R. N. Van Brunt.	318 Pine St
Gould & Curry S. M. Co.	Nevada, 55.	50, Mar 8.	Apr 1.	May 4.	A. K. Durbin.	309 Montgomery St
Hazard Gravel M. Co.	California, 1.	03, Jan 28.	Mar 1.	Mar 28.	J. T. McGeehegan.	328 Pine St
Hale & Norcross M. Co.	Nevada, 33.	50, Mar 9.	Apr 14.	May 4.	J. F. Lightner.	339 Montgomery St
Imperial Marble Co.	California, 1.	01, Mar 15.	Apr 18.	May 9.	F. Von Rehn.	524 California St
Lone Jack M. Co.	California, 1.	05, Jan 27.	Mar 7.	Mar 28.	J. M. Bunting.	309 California St
Lady Washington M. Co.	Nevada, 6.	25, Jan 28.	Mar 7.	Mar 28.	W. H. Watson.	302 Montgomery St
Manhattan S. M. Co.	Nevada, 2.	1,000, Feb 2.	Mar 7.	Mar 22.	J. Crockett.	327 Pine St
Mayflower M. Co.	California, 24.	25, Jan 19.	Feb 28.	Mar 18.	J. M. Loring.	309 Montgomery St
Nevada Queen M. Co.	Nevada, 2.	50, Mar 10.	Apr 19.	May 6.	H. Deane.	309 Montgomery St
North Belle Isle M. Co.	Nevada, 12.	25, Jan 14.	Apr 19.	May 11.	J. W. Pew.	310 Pine St
N. Banner Con. T. Co.	California, 16.	04, Jan 1.	Feb 25.	Feb 28.	T. J. Mitchell.	Grass Valley
Overman S. M. Co.	Nevada, 57.	30, Jan 21.	Feb 25.	Mar 18.	G. L. Edwards.	414 California St
Paradise Valley M. Co.	Nevada, 57.	25, Jan 19.	Feb 28.	Mar 18.	J. M. Loring.	309 Montgomery St
Potosi M. Co.	Nevada, 8.	30, Mar 9.	Apr 14.	May 4.	C. E. Elliot.	309 Montgomery St
Phelps Manufacturing Co.	California, 1.	5,000, Feb 12.	Mar 21.	Apr 5.	W. H. Phelps.	17 Drumm St
Pheasant Con. M. Co.	California, 2.	1,433, Jan 26.	Mar 5.	Mar 28.	C. Collicott.	516 California St
Richfield M. Co.	California, 3.	124, Mar 9.	Apr 15.	May 12.	G. L. Loring.	4th and Townsend St
Sagehen M. Co.	California, 67.	25, Jan 19.	Feb 28.	Mar 18.	J. M. Loring.	309 Montgomery St
Spring Valley M. Co.	California, 2.	34, Jan 22.	Mar 5.	Apr 4.	H. Pichor.	320 Sansome St
Sierra Iron Co.	California, 6.	2,500, Feb 17.	Mar 30.	Apr 23.	H. P. Bush.	431 California St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Belmont M. Co.	Nevada, J. W. Pew.	318 Pine St.	Special, Mar 25
Con Washoe M. Co.	Nevada, P. MacEwen.	314 Montgomery St.	Annual, Mar 24

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M. Co.	Nevada, A. W. Hains.	309 Montgomery St.	50	Dec 20
Martin White M. Co.	Nevada, J. J. Scoville.	309 Montgomery St.	25	Nov 30
Paradise Valley M. Co.	Nevada, V. Letta Oliver.	328 Montgomery St.	10	Nov 30
Silver King M. Co.	Arizona, J. Nash.	328 Montgomery St.	25	Mar 15

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 24.	WEEK ENDING Mar. 3.	WEEK ENDING Mar. 10.	WEEK ENDING Mar. 17.
Alpha.....	3.10	3.70	3.25	4.00
Alta.....	1.30	1.60	1.50	1.70
Andes.....	.65	.70	.60	.75
Argenta.....	.15	.20	.15	.25
Belcher.....	2.50	3.40	2.85	3.10
Best & Belcher.....	.75	.85	.70	.90
Bodie.....	1.25	1.75	1.10	1.25
Bodie Tunnel.....	1.25	1.75	1.10	1.25
Baltimore.....	.75	1.00	.90	1.00
Belle Isle.....	.30	.35	.30	.35
Bodie Con.....	2.00	2.50	2.85	3.25
Benton.....	.35	.50	.65	.75
Bulwer.....	1.25	1.50	1.15	1.40
Con. Va. & Cal.....	1.50	2.00	1.75	1.90
Challenge.....	2.00	3.25	2.25	2.80
Champion.....	.75	.80	.70	.80
Chollar.....	.30	.35	.30	.35
Confidence.....	.65	.80	.75	.80
Con. Imperial.....	2.25	3.00	2.50	3.00
Con. Pacific.....	.50	.55	.50	.55
Crocker.....	.75	1.25	1.00	1.50
Crocker.....	.875	1.25	1.00	1.50
Central.....	.55	.60	.55	.60
Dudley.....	.25	.30	.25	.30
Durbin.....	1.30	1.50	1.40	1.60
Eureka Con.....	.75	.80	.75	.80
Exchequer.....	1.40	1.55	1.30	1.60
Grand Prize.....	.40	.45	.40	.45
Gould & Curry.....	4.10	5.10	4.25	5.10
Hale & Norcross.....	6.25	6.50	6.25	6.50
Holmes.....	3.25	4.00	3.00	3.50
Independence.....	.65	1.00	.55	.70
Iowa.....	.65	1.00	.55	.70
Julia.....	.65	.70	.60	.65
Justice.....	1.35	1.70	1.40	1.60
Kentuck.....	.75	1.00	.80	1.10
Lady Wash.....	.20	.25	.15	.20
Martin White.....	.20	.25	.15	.20
Mono.....	2.60	3.60	2.80	3.60
Mexican.....	3.50	4.50	3.50	4.50
Mt. Diablo.....	3.50	4.50	3.50	4.50
Northern Belle.....	.90	1.00	.90	1.00
Navajo.....	.90	1.00	.90	1.00
North Belle Isle.....	4.40	4.75	4.50	4.70
Niagara.....	1.55	1.75	1.50	1.70
Nev. Queen.....	1.55	1.75	1.50	1.70
North G. & O.....	.50	.55	.50	.55
Occidental.....	2.75	3.00	2.50	3.00
Ophir.....	9.25	12.50	8.50	11.50
Overman.....	1.50	2.00	1.80	2.25
Potosi.....	7.50	8.70	8.25	9.50
Peerless.....	.55	.60	.50	.55
Peer.....	.40	.50	.45	.50
P. Sheridan.....	.10	.10	.10	.10
Silver Star.....	5.00	6.25	4.90	5.50
Savage.....	5.00	6.25	4.90	5.50
Seg. Belcher.....	4.50	5.10	4.80	5.25
Sierra Nevada.....	.30	.35	.30	.35
Silver King.....	.75	.80	.70	.80
Scorpion.....	.75	.80	.70	.80
Syndicate.....	.25	.25	.25	.25
Union Con.....	3.50	4.40	3.65	4.40
Utah.....	6.50	7.25	6.15	7.00
Yellow Jacket.....	.50	.55	.50	.55

Sales at San Francisco Stock Exchange.

THURSDAY Mar. 17, 1887.	100	Independence.....	20c
100 Andes.....	1.35	550 Julia.....	60c
200 Alta.....	2.25	200 Justice.....	1.70
100 Argenta.....	.45	200 Kentuck.....	1.50
250 B. & Belcher.....	10.15	100 Lady Wash.....	40c
70 Bodie.....	2.80	800 Mexican.....	2.40
200 Bodie Con.....	2.95	150 Mt. Cory.....	.70
200 Belcher.....	3.35	70 Mono.....	.275
600 Baltimore.....	1.01	550 Navajo.....	.80c
100 Belle Isle.....	.45	1250 Nev. Queen.....	1.85
100 Benton Con.....	7.50	100 Ophir.....	1.10
200 Bulwer.....	1.30	200 Overman.....	1.95
300 Chollar.....	.60	200 Occidental.....	.40
50 Con. Va. & Cal.....	1.75	1450 P. Sheridan.....	1.0c
150 Crocker.....	4.40	500 Potosi.....	8.00
550 Crocker.....	4.05	400 Peer.....	.85c
300 Con. Imperial.....	.30	185 Savage.....	.54
225 Central.....	.00	200 Scorpion.....	.85c
100 Caledonia.....	.65	320 Sierra Nevada.....	.45
200 Chalder.....	.50	500 Silver Hill.....	1.40
700 Exchequer.....	1.65	400 Syndicate.....	.2c
150 East B. & B.....	1.50	500 Union Con.....	3.80
350 Gould & Curry.....	4.90	425 Utah.....	1.90
750 Hale & Nor.....	.50	200 Yellow Jacket.....	.50

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

MICHAEL GREELY, an old-time prospector, died at Garfield on the 4th inst.

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, Mar. 17, 1887.	
ANTIMONY—French Star.....	84 @
BORAX—San Bernardino.....	— @ 8
ARMAGOSA.....	— @ 6
IRON—Glengarrowton.....	— @ 23.00
Eglington, ton.....	— @ 22.00
American Soft, No. 1, ton.....	24.00 @ 24.50
Oregoo Pig, ton.....	1.00 @ 23.00
Clippas Gap, Nos. 1 & 2.....	22.00 @ 23.50
Clay Lane White.....	21.50 @
Shotts, No. 1.....	23.50 @
COPPER—	
Roht.....	25 @
Sheathing.....	18 @ 23
Ingot.....	12 @ 13
LEAD—Pigs.....	4.75 @
Bar.....	6.25 @ 6.50
Sheet.....	5 @
Shot, discount 10% on 500 bag Drop, 5 bag.....	1.65 @
Buck, 3/4 bag.....	1.85 @
Chilled, do.....	2.05 @
QUICKSILVER—By the flask.....	35.00 @ 38.00
Flasks, new.....	1.00 @
Flasks, old.....	.85 @
STEEL—English, lb.....	14 @ 15
Black Diamond, ordinary sizes.....	10 @
Flow.....	4 @ 6
Grass Valley.....	10 @
Sanderson Bros.....	8 @ 9
ZINC—German.....	8 @ 9
Sheet, 7x3 ft, 7 to 10 lb, less the cask.....	6.00 @
TINPLATE—Oreok.....	4.90 @ 5.00
Charcoal.....	6.25 @ 6.50

New York Metal Market.

Telegraphic advices dated March 17th give the following New York prices:

BAR SILVER—99 1/2 per oz.
COPPER—100 1/2 @ 101.
IRON—No. 1, \$22.00 @ 22.50.
LEAD—\$4.40.
QUICKSILVER—53 @ 54c.

The following is the latest by mail from the "New York Metal Exchange Market Report":
COPPER—Steady, spot closing at \$10.65 @ —. Transferable Notices (Lake) issued at \$10.65 @ —. Transferable Notices (Chili) issued at \$10.65 @ —.
LEAD—Steady at \$4.35 @ 4.55 spot. Transferable Notices issued at \$4.45.
TIN—Firm at \$22.40 @ 22.50. Transferable notices issued at \$22.65.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' values. All prompt delivery. Australian Tin, \$22.70 @ 22.90; Billiton Tin, \$23.10 @ 23.40; Banca Tin, \$25.16 @ 25.50; Baltimore Copper, \$9.70 @ 10.15; Orford Copper, \$10.00 @ 10.25; P. S. Copper, \$10.00 @ 10.25; Foreign Lead, \$4.80 @ 4.85; Foreign Spelter, \$4.80 @ 4.90.
MAKERS' PRICES—At tidewater. 100-ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$21.00 @ 22.50; No. 2, \$20.00 @ 21.00; Grey Forge, \$17.50 @ 19.00; Hudson River, Grade No. 1, \$21.00 @ 22.00; No. 2, \$20.00 @ 21.00; Grey Forge, \$17.50 @ 19.00; Southern, Grade No. 1, — @ —; No. 2, — @ —; Grey Forge, — @ —.

ASSESSMENT NOTICE.

The Phelps Manufacturing Company.—Location of principal place of business, San Francisco, California. Location of works, San Francisco, Cal.

NOTICE is hereby given, that at a meeting of the Board of Trustees, held on the 12th day of February, 1887, an assessment (No. 1) of Five Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, 17 Drumm street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 21st day of March, 1887, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Tuesday, the 6th day of April, 1887, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Trustees.
W. H. PHELPS, Secretary.
OFFICE—17 Drumm St., San Francisco, Cal.

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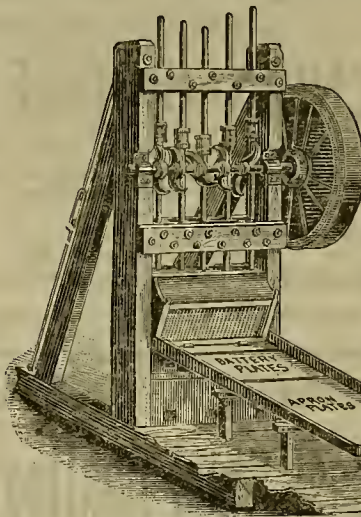
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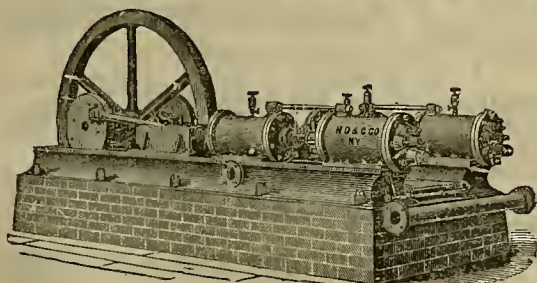
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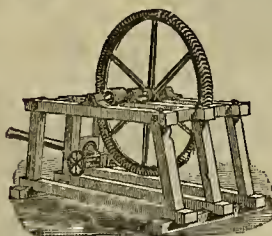
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COMPRESSED AIR and WATER POWER MACHINERY.

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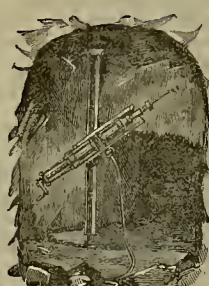
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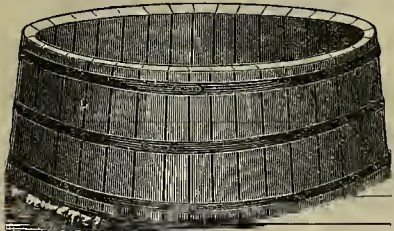
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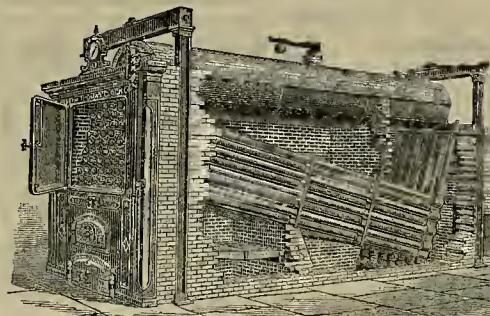
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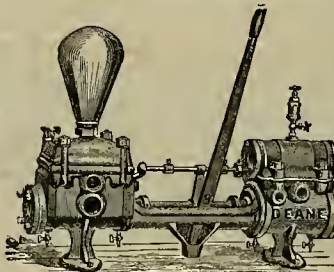
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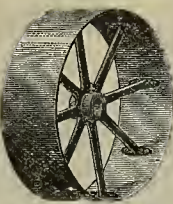
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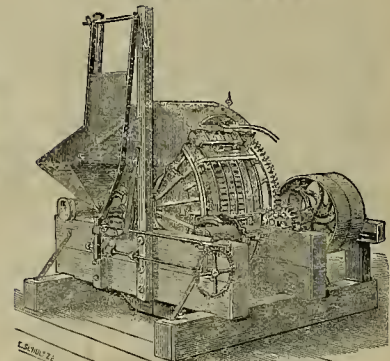
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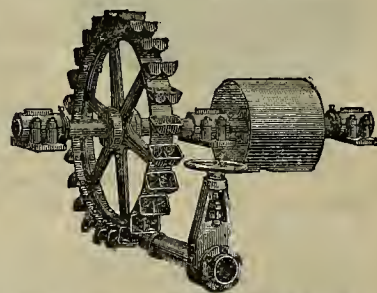
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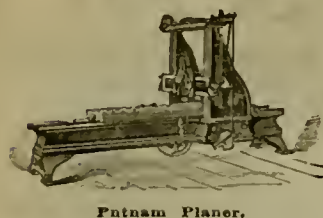
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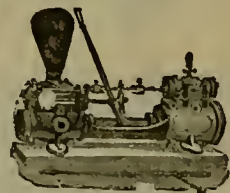


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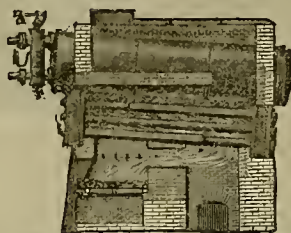
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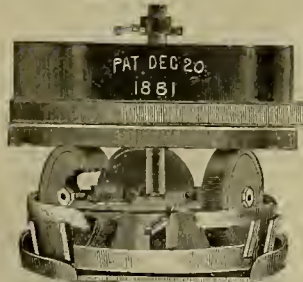
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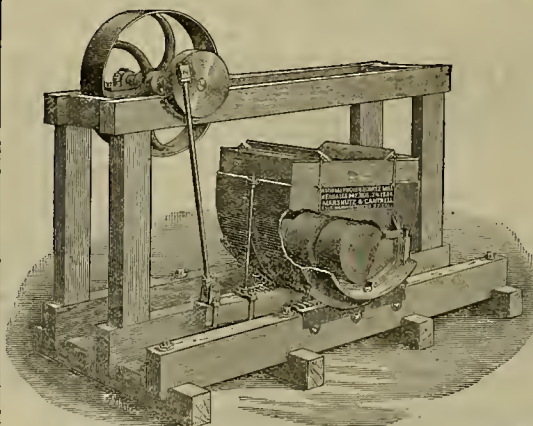
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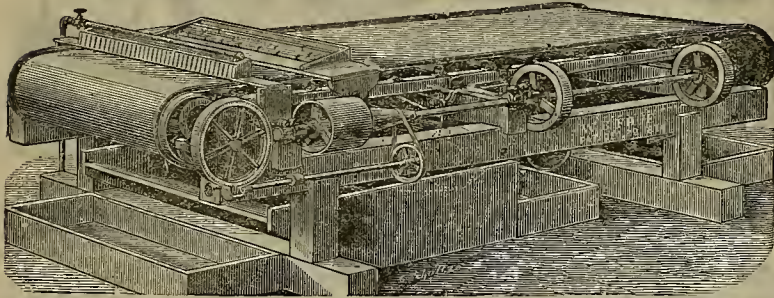
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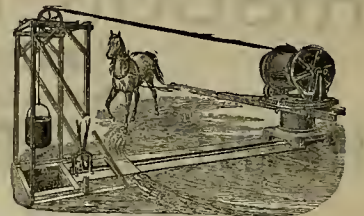
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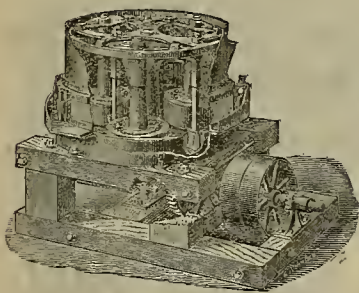
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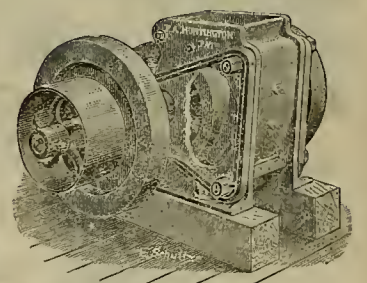
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SAN FRANCISCO, SATURDAY, MARCH 26, 1887.

VOLUME LIV
Number 13.

New Dredging Machinery.

We illustrate on this page the new dredger "Ajax," recently built for Mr. Geo. F. Smith, of Stockton, Cal.

It is entirely a Stockton production, and one of which that city will have no cause to be ashamed. The dredger has now been working for two weeks at Wakefield's, and, we are informed, is giving entire satisfaction; having been repeatedly timed to be discharging clay at the rate of 220 cubic yards per hour.

The Ajax is almost a duplicate of the last dredger designed by Mr. Ferris for levee-building on Roberts island, with such modifications and improvements as have suggested themselves in the two years it has been working.

The hull, oval in plan, is 36 feet 10 inches by 60 feet over all; it has 4 solid fore and aft bulkheads, and a well-hole 5x12 feet at one end for the bucket ladder.

The main engine is 10x24, operating by bevel gearing, and a 3½-inch vertical shaft, with a 4-sided upper tumbler with 21-inch sides. This engine works also a gypsy shaft for swinging, and the conveyor that carries the mud ashore. A steam hoist with 6x11 engines raises and lowers the bucket ladder. The buckets, at 4-foot centers, have a struck capacity of 5 cubic feet and are speeded to deliver from 18 to 20 a minute, according to the character of the material being handled. They are of hoiler iron, with a 5-inch steel nosing. The links are of wrought iron, with cast bushings. The lower tumbler is hexagonal, on a 4-inch shaft.

The conveyor, projecting 72 feet from the center of the boat, consists of a 5-ply rubber belt 36 inches wide; running over iron drums at each end, and intermediate iron friction rollers at 3-foot centers. Ratchet and pinion on each side of conveyor ladder give means for taking up the slack of the belt, and adjusting the drums to maintain them parallel.

This conveyor is the important feature of the dredge. It is entirely satisfactory in its working and delivers its material, as nearly as may be, in a dry state upon the levee. It was feared the rubber belt would be short-lived, but a 4-ply belt ran continuously for over two years on the Roberts island dredge before it needed replacing.

The hoiler is of the marine type, 52 inches by 10 feet 6 inches, with 3 inch tubes and 14-inch flues; and burns about 1400 lbs. of steam coal in a day of 12 hours. There are three pumps aboard—a hand forcepump for washing hoiler, a plunger pump for hoiler feed, and an Evans steam pump to throw a jet of water into the delivery hopper when digging in any very tenacious material. All three are connected with the hoiler.

Water tanks below deck serve to trim the boat and furnish a supply for the hoiler. The dredger cuts by swinging on a center spud 16 inches in diameter, and moves forward from 8 to 10 feet at each fleet.

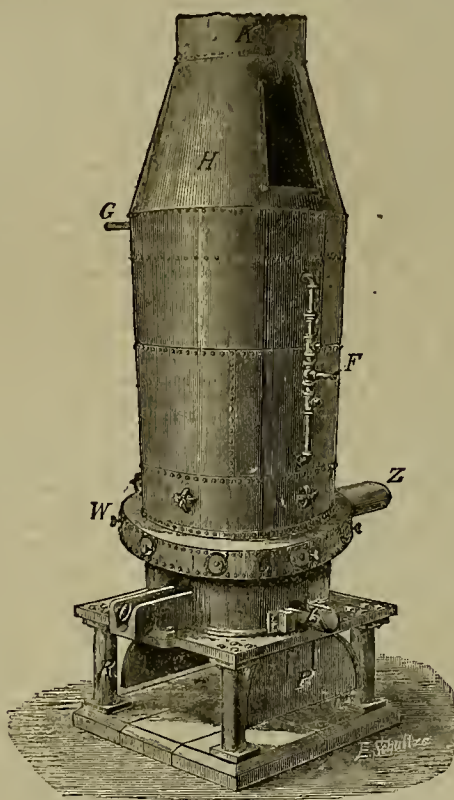
The Roberts island dredger, of which the Ajax is an improved copy, handles steadily 700 yards per day of 12 hours, in the stiffest and most tenacious clay in which it has been worked; and ranges from that average to 1500 yards per day in soft peaty mud.

The Ajax was built by contract by Farrington, Hyatt & Co., of the Stockton Iron Works; their bid having been very considerably below that of a San Francisco firm with whom they were in competition; a fact that certainly pays

handsome tribute to the facilities of Stockton manufactories. The hull and framing were built by D. Jarvis, who has succeeded the late S. H. Davis, as proprietor of the Stockton Shipyard.

This type of dredger can be built for about

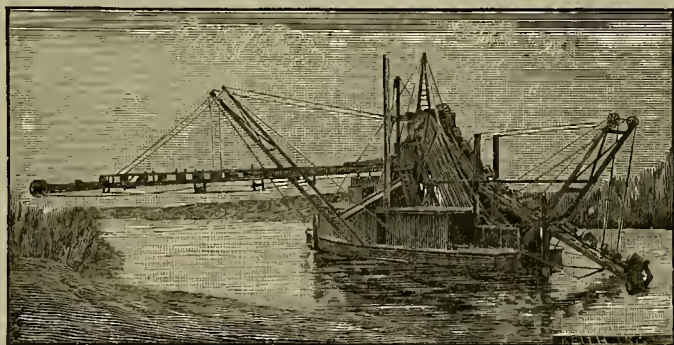
MINING WORKS DAMAGED.—On Wednesday morning the buildings of the Bald Mountain Extension Company, at the mouth of their tunnel in Forest City, were burned, the fire starting from some overheated tar on a stove in the old office. A portion of the spiling and some



WATER-JACKET COPPER FURNACE.

\$12,500, and we are informed can be relied on for a monthly average of 26,000 yards in any material met with in the overflowed lands near

of the breasting caps, with the blacksmith and carpenter tools, were destroyed. The tunnel timbers were saved. Thirty men working over



THE NEW DREDGER "AJAX."

Stockton, delivered 50 feet ashore at a height of 10 or 12 feet above the ground line.

THE Dominion Government has decided to send to British Columbia a party to make geological surveys. The Government hopes, with the co-operation of the United States, to establish the boundary lines between the two Governments.

IMPORTANT discoveries of gold are reported from Alexander City, Ala.

Water-Jacket Copper Furnaces.

The water-jacket furnace is now generally employed in this country for the melting of oxidized and other copper ores. The engraving on this page shows the general form of the furnace, and by means of the letters in the cut, the operation is readily explained. The furnaces consist simply of a casing with an outer and inner shell of iron, between which water freely circulates. Some 25 or 30 gallons of water per minute are required for this purpose. The inlet of the water is through the pipes, *F*; the outlet is through *G*. Hand-holes in the bottom of this space are arranged to permit ready access for cleaning. A great deal of the water in the mining regions contains lime, and the water space of the water-jacket scales almost as rapidly as a boiler, thus making these hand-holes imperative. The blast through *Z* is carried around the furnace in the circular casing, *G*, and enters through the tuyeres. Opposite each tuyere is a hand-hole (and an eye-hole) in this casing, which permits ready access to the interior of the furnace.

The outer shell of the furnace is continued down some distance below the water-jacket, and there forms the casing of the crucible. The interior of the crucible is lined with fire-brick and clay. This clay bottom of the crucible rests on the hinged iron doors, *P*, which can be dropped at any moment, when the furnace is blown out, to remove accretions in the furnace or for any other purpose.

The slag lip *L*, attached to the furnace, carries off the cinder. The tapping notch, *O*, is used for tapping the metal produced. The whole furnace stands on four pillars, *R*, and is covered by the hand *H* leading to the stack *K*. The hand *H* has a charging door out in it. The level of the charge is usually kept about a foot below this charging door.

A furnace of this class, 42 inches in diameter at the tuyeres and 9 feet high, driven by a No. 4½ Baker blower, run 100 to 120 revolutions, will readily smelt 40 tons of ore per day. With increased blast an average of 50 tons has been smelted in these furnaces, and even 60 tons have been put through them. Mr. Arthur Wendt, in his paper on the "Copper Ores of the Southwest," before the American Institute of Mining Engineers, says the experience at Globe and elsewhere has proved that a forced rate of smelting leads to an increased loss of copper in the slag, and is not economical. Excellent smelting is done in these furnaces. The charging is done like that of an iron furnace, in horizontal layers, charges of coke, ore, and the necessary fluxes alternating in regular order. The coke mainly used for fuel on this coast is what is known as patent English coke from Cardiff, Wales.

THE Arizona Citizen says: Mining matters at the Quijotas are looking up, sud, while there is no semblance of a boom, a great deal of activity exists, and the fact is being better demonstrated daily that this is one of the coming great mining camps of the Territory.

THE debris suit brought by Stockton against the hydraulic miners was decided for the defendants Saturday, on the ground that the natural wash and the plowing of the ground is responsible for the debris to an excessively large extent.

THE newly discovered petroleum fields of San Benito county are being carefully examined,

SENATOR TABOR, of Colorado, has purchased for \$265,000 the well-known Vulture mine, with its mill, mill-site, etc. The new superintendent is Cyrus Drihble. This is one of the oldest of the Arizona mines.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Petrification of Ores.

EDITORS PRESS:—In the issue of your paper of January 22, 1887, there appears an account of a "petrified forest" near Calistoga. I have personal knowledge of two other cases similar to that which is described, one being in Oregon and the other in Texas. In your article you seem to attribute the phenomenon which you describe to volcanic action. Those of which I have knowledge certainly could not have been produced in that manner. The valley of Richland Creek, a small feeder of the Trinity river, in Texas, is chiefly very rich prairie soil, but there are intervening narrow strips of barren, sandy soil which have on them a scattering growth of scrubby oak and hickory trees. Interspersed everywhere among those living trees there are, lying entirely on the surface of loose level sand, petrified trunks with the larger branches spread in a natural position of trees unmistakably of the same variety as those still standing alive around them. They are always broken squarely across into short sections, sometimes being split evenly into thin pieces resembling short wooden pickets. There cannot possibly have been any volcanic eruption within hundreds of miles of that valley since its formation. Near the town of Dalles, in Oregon, there are petrified stumps of yellow pine trees yet standing in place where they grew in stony soil, with the same variety of trees now growing in the immediate vicinity. When a boy I had knowledge of a single petrified tree trunk lying on the surface of alluvial soil, the trunk appearing to be of sycamore, a variety of timber growing abundantly nearby. That place is certainly very remote from the seat of any recent volcanic agency. Without having seen the Calistoga trees, I conclude, from observation elsewhere, that you are at fault with regard to the theory of the manner in which they were produced.

JUSTIN CHENOWETH.

Tuolumne County Notes.

EDITORS PRESS:—A visit to the Patterson mine, at Tuttle town, discloses a fine property. It was reported about two years ago that the mine could not be made to pay, that there was no more rock ore. Mr. Morris, the present superintendent, after an examination, reported to the owner, Mr. Prince, of Boston, that there was plenty of rock, and after repairing the old machinery, started up, and has been hard at work ever since, crushing ore, of which there is sufficient in sight to keep 40 stamps busy. It is contemplated to increase to that number this summer. The total force employed to extract 50 tons a day is 18. The ore is of a highly sulphureted character, and it is owing to this fact that the gold is difficult to save.

Mr. Morris is a practical miner, and it is due entirely to his earnest efforts that the mine has been made a paying one.

The Divoll Bonanza, at Sonora, has again startled the community; another rich pocket found, to the tune of \$65,000. This mine has proven wonderfully rich, and the owners are confident it is not half worked out. The water has just been let in to the ditches, and mining men are hard at work on their claims, with bright anticipations for the summer.

THE LICK TELESCOPE.—Captain Thomas E. Fraser, the superintendent in charge of construction at Mount Hamilton Observatory, in the course of conversation with a reporter, said that the work at the observatory is progressing finely. "But I am afraid," he continued, "that the placing of the big telescope will be somewhat delayed. It was agreed that the instrument should be in place for inspection by the 1st of April, but late advice from Cleveland, Ohio, state that the work on the pedestal and substructure is still in progress, and I do not think that we will have it in position until some time in September next. Captain Floyd will go on to inspect it when it is completed, but thus far has received no notification to make ready for his departure. The pedestal or base will be one solid piece of steel, and the entire weight of the substructure will be 28 tons." Captain Fraser also said that in consequence of the death of the noted mechanician Fields, which lately occurred in London, the contract which had been let to him for making the third photographic lens—a most intricate piece of work—would probably be changed. The dome, it is expected, will be placed in position in about three weeks. The work thus far has been most satisfactory.

A MILL FOR EL PASO.—A diepatch from El Paso, Texas, dated March 18th, says: The Grande Milling and Refining Co., which has a large stamp mill in the City of Guanajuata, Mexico, has proposed to our citizens the establishment of a smelter, reduction works and a refinery here if they will donate sufficient land for their use, with water-power for the same and a rebate of the taxes on the plant for a term of years. The managers of the above-named company are ex-Governor Gregory Smith, of Vermont, president of the Vermont Central rail-

road; ex-Governor J. B. Loomis, of Connecticut, president of the Dayton & Wooster railroad; D. D. Conover, president of a New York city street railroad; Havemeyer, the millionaire sugar refiner of New York, and President Ross, of the Canada Grand Trunk railroad. They represent over \$200,000,000 and they have \$200,000 worth of machinery already purchased and en route to Guanajuata, which they will stop here if the donation which they ask, and which will only cost the city about \$15,000, is made. A committee of prominent citizens is soliciting funds to day to make the purchase. The establishment of the plant seems now to be assured and will compete with Kansas City. The mill will treat all ores from Mexico, New Mexico and Arizona.

Injustice to the Miners.

Minning or Grazing and Timber Land.

The Fine Gold Miner (Hildreth, Fresno Co.)

says:

It has been learned of late that the Abbey Mining Company and Charles O'Neil are trying to obtain a patent from the State for the 640 acres comprising section 36, township 9 south, range 21 east, as grazing and timber land. At the time of the sectionizing of this and adjoining townships, in 1872, by Benson and Glover, United States land surveyors, then working under contract with the Government, all mining to speak of had ceased for want of capital to develop the rich deposits of mineral that is now being brought to the surface by different mining companies; and for want of metallurgical knowledge, undoubtedly, the Surveyor's report was to the effect that the section was more valuable for its oak timber and grazing than for its mineral deposits. This is how the case now stands at the Land Office in Sacramento. But will some authority upon such matters inform the *Miner* how any citizen or company can file a timber claim upon a section that has 18 paying quartz ledges, numerous good prospects, and seven placer claims thereon, not including the Abbey mine, that has been producing \$50,000 monthly since last June, the Hildreth mine, that has expressed \$75,000, and which to-day is the best mine of the district—one being situated in the east half and the other in the west half of the section filed on; and the filer of the west half owning one-third interest in a prospect that he holds at \$1000, while the McNally Company would not sell their mine for \$500,000. The granting of this claim would work a great injury to our miners and prospectors, who have shafts and tunnels hundreds of feet in length upon ledges on this land that will mill from \$18 to \$100 per ton; and as to the few standing oaks upon this section that are situated upon these claims, the miner rightly becomes owner of in order to carry on the development of his prospect. Of course we all understand the object here of the claimants. It is their purpose to secure the few remaining cords of oak wood for the Abbey Company, and to protect themselves against the power of the U. S. Marshal to claim stumpage. Other than for mining purposes this land is valueless eight months of the year. It is burnt and baked to that degree that the pick leaves little impression against its hard surface. This land heretofore was always supposed to be school land, but nevertheless it is mineral if ever a section was; and we think that our citizens have gone at it in the right way—to prove by over 100 miners' depositions to the Department that the land ought to revert back to the U. S. Government as mineral land. Not only is the surface of this section covered here and there with the croppings of mineral-bearing quartz and float, but scarcely is there a gulch and ravine that does not prospect placer gold in paying quantities. There is no doubt but that the action taken by our miners will accomplish the desired result.

NYE COUNTY MINES.—The Belmont *Courier* says: Nye county is thick with low-grade mines that will be worked as soon as railroads will enable parties desirous of operating them to get in mining supplies at a price that will justify opening them on an extensive scale. A railroad through Nye county will do more to develop its resources than is generally imagined. Capital will not handle low-grade mines where supplies have to be hauled 100 miles or more by mule teams. When a company of men put up their money to work a low-grade mine they will select one where freight will not be the largest item of expense. We look for a boom in this county as soon as the through railroad is completed, and a lasting boom at that. A steady era of prosperity will set in when the Ophir, Belmont, Spanish Belt, Tybo, Manhattan, Revelle, Morey, Danville, Hot Creek, Jefferson, San Antonio, Northumberland, Jett, Park, Washington, Ione, Grantsville, Centerville, Ellsworth, Downeyville, Globe, New Buffalo, Lodi, Gold Park and Paradise mines are operated to their fullest capacity, which will be when railroads are handy and freight low.

BACK NUMBERS WANTED.—In order to complete certain files of the MINING AND SCIENTIFIC PRESS, we should be glad to get certain back numbers. Any one having any of the following numbers of the PRESS will please communicate with this office:

1869—Jan. 2d, 9th, 16th. Feb. 27th. March 20th. April 17th, 24th. May 1st. June 12th, 19th, 26th. 1875—Sept. 11th. 1880—July to December.

Pocket Mining.

The Divoll Bonanza in Tuolumne County.

A correspondent of the Tuolumne *Independent*, speaking of the Divoll bonanza, says:

This wonderfully rich mine, "The Divoll Bonanza," has again come to the front as a gold-producer—yielding in the past few days, \$65,000. This time the gold has been found on the footwall; whereas formerly all the pockets have been found on the hanging-wall vein. There are three veins in the fissure—one on hanging, the other below in the dyke, the third on footwall. They all average eight inches on and off. In the present case this footwall vein is as large as nine inches. Both walls are metallic slate. The filling of fissure is an eruptive rock, or igneous dyke "diorite," decomposed and oxidized in the upper levels of the mine, getting harder as depth is attained. The gold is formed by a quartz or raw crossing, running with the slate and having same dip as latter. At the point of contact the gold is thrown, almost always to the east. Course of fissure, east of north, 45 degrees; angle of dip, 25 degrees—a flat fissure vein. The "shoot" is found sometimes close to the crossing; then, again, some ten feet to the east, which is the case in the present find. This is the first occurrence in the history of the mine of any deposit of precious metal having been found on the footwall vein. This Bonanza, as far as exposed, is 18 feet on the length of the vein, and three feet in depth; but the present lucky owners have a good prospect of yet taking out as much more before the pocket will be exhausted. In fact, it may now almost be considered a new mine, this vein never having been worked on before; and as the pockets on the hanging-wall formerly "bunched" in that shoot, nearly every 10 feet as sunk on, there is no reason why the footwall vein should not throw gold in like manner. This gives some little idea of the great value of this property, and it would not surprise me if the mine produced in the future as much, or more, than ever has been taken out; at any rate, present indications warrant the assumption. The width of the fissure is from 9 to 12 feet, and carrying the three veins, as before stated, with dyke as filling matter. The gold is worth about \$19.20 per ounce.

It may be of interest to some of your readers to give a brief history of this very remarkably rich mine—this almost fabulously Aladdin's lamp of Tuolumne county.

This mine—which is located on the west side of Washington street, in the city of Sonora—was first discovered in '51 by Chilians, who took out a large amount of gold and left for their native soil rich men; but in those days a pocket mine was considered worked out after the first "bunch" was extracted. The idea of there being any chimney or shoot was not understood then. But time, and further explorations by other parties, proved the fallacy of the then conceived idea. After the Chilians had worked out this pocket they sold it to an English company, who in their turn also unearthed considerable gold, but either gave it up or sold—thinking sure that the mine was then actually worked out. But the late Capt. Clark and Joe Bray had a different opinion. They purchased it, I believe, from Messrs. Edwards and Sexton for \$50. Then these two indefatigable miners set to work, prospecting and sinking, with a small windlass. They obtained good prospect going down, and Mr. James G. Divoll became then interested through Joe Bray, they being old partners. Suffice it to say, that during their tenure they extracted nearly \$1,000,000, from 1878 to 1882. After that time, Clark felt he had enough money for his wants; and Bray thinking likewise, both sold to Divoll. Hence his name to the mine became as familiar as household words. Divoll then worked it under the superintendency of Mr. Bray, taking out \$100,000. The mine became wet and somewhat expensive to work. Divoll put up steam-pumping and hoisting works, but not being of a very high class of machinery—what might be called a "make-shift"—did not meet the desired end. He sublet to Capt. Colby, another old pocket miner, who owns the north extension, on the same fissure (who has also been very lucky in finding rich gold in his mine), who concluded to lease the Divoll. He increased the steam-power, but was unfortunate, getting nothing of any moment. Although, as I have been told, he was within six feet of the last rich strike which we now chronicle, he gave it up for want of funds. Divoll then took two San Francisco gentlemen as partners. They put a crosscut adit level from the creek, some 600 feet in length, but found when the vein was tapped that it left them still some 200 feet from bottom of incline. This company of three, gradually tired of their venture, sold back to Divoll, he having unbounded faith and confidence that the "Aladdin's lamp" would shine again; that it was there, and only required time, money and energy to develop still richer bonanzas. He leased the mine lastly to Meese. Dart and Dave Oliver on a certain percentage. Dart, not caring to pack his interest as a whole, made arrangements with another old and experienced miner, Mr. A. P. Johnson, to work his share, this arrangement being satisfactory to all concerned. The party went vigorously to work, above water level, through the adit; and, believing that, as the hanging-wall had been so rich, the footwall on the same gold line should produce pockets, they have been now, as before stated, handsomely re-

warded for their faith. These gentlemen have a thorough knowledge of pocket mining, and possess the requisite "grit" to stay with it and hack their opinions by cash to develop. Our old friend, Divoll, has now realized his oft-expressed opinion that there are millions in the old mine yet, and that ten times as much as ever has been found. That may or may not be; but indications point strongly that such may be the result in the future.

This latest find in old Tuolumne give a great impetus to prospecting. The expenses attached to pocket mining are very small; no expensive mills required, but a good grinding and amalgamating pan is the only desideratum. A small melting furnace is very handy.

I will just mention one feature of this vein before I close. The size of vein and length of "shoot" on the vein depends on the size of the pockets. For instance: From the center of the richest part of the pocket, which is almost pure hullion, it radiates in a circle to, in some cases, 20 to 30 feet, spreading over the vein, the outside being less rich than the center, forming very rich milling ore—several tons to each pocket. The bonanza portion is cleaned of the adhering quartz, and melted into bars. The gold seems to be formed, almost, so to speak, in concentric rings—richest in center, and gradually weaker till exhausted to outer circle. This was the case on hanging-wall. The footwall, in this case, adapts itself to a plane, forming a parallelogram.

The Government Printing.

Perhaps few are aware that the United States Government is the greatest printer and publisher in the world. Every one who has made a hasty visit to Washington has come away with the vague impression that something immense in that line is going on. The real fact is greater than the impression. No one can form an adequate idea of the vast extent of the Government printing business until he takes time to examine it in detail. He must visit the Government printing establishment, a huge building looming up north of the Capitol. Here he will find that printing presses are counted by the dozens, type reckoned by the ton and paper by the carload, and hundreds of men and women at work, day and night, type-setting, stereotyping, printing and binding, and the thousand processes incidental to such a business. The presses, type and material of all kinds are the best procurable. Uncle Sam keeps up with the times in utilizing the latest and best labor-saving mechanisms.

Then there are two large buildings to the south of the Treasury Department, almost under the shadow of the Washington monument, where our visitor will find the Bureau of Engraving and Printing. Here the fine work is done; the notes and stamps are printed and the Government engraving accomplished. It is an immense establishment, and a hurried walk through the rooms open to the public will show hundreds of men and women, boys and girls at work on splendid presses, costly material, and so much of the fine work as the public is allowed to see. Next let him visit the Government storehouse and take a glance at the tons of books piled up like cord-wood, and he will begin to have some conception of what the Government is doing. The aggregate number of Government publications now annually amounts to about 2,500,000, of which 500,000 are bound volumes.

If he cares to explore what comes of this vast mass of printed matter, he will find a deal of waste and extravagance. Most of the books and pamphlets published by the Government are intended for general distribution, and the theory is that they are sent as far as practical to the public and college libraries of the country. But it is safe to say that not one in ten are supplied with these publications, many of which are of great value to science and history. There is not a library in this State to-day that has a complete set of all the various public documents. One of our late Congressmen, having occasion to look up a matter in the *Congressional Record*, visited the libraries of San Francisco and the State Library at Sacramento and failed to find the number he wanted. This is owing to the defective and vicious system of distribution which depends largely upon the members of the two houses of Congress. Some of the members take pains to distribute public documents where they will do the most good, but the average Congressman regards them as official perquisites to be used where they make friends and influence votes. They are just as apt to go to a corner grocery or a city ginmill as to a public library. Many are too busy or too lazy to hunt up the people or libraries that would appreciate such publications, and find it easier to add to their cigar money by selling their shares to the brokers. Every one who has been to Washington and had occasion to look into the matter, knows that the brokers and second-hand book dealers carry on quite a lively local trade in these publications. Reports that cost the Government from 50 to 75 cents may be found at retail in the broker's shops at from five to ten cents a copy. There is no good reason why our public libraries should be so scantily supplied with public documents, for they may be had in abundance for the asking.

W. A. CLARK and others recently purchased the Hunter group of mines in the Cour d'Alene country for \$90,000.

Treating Wine by Electricity.

A New and Important Discovery.

One of the most interesting features connected with the late Viticultural meeting at the Grand hotel in this city, was the exhibit of Dr. Edwin J. Fraser, of his new process for aging wines by electricity, or rather by magnetism; for wine, by this process, is not submitted to the direct action of electricity, but is simply placed in the magnetic field produced within the circumference of an electric coil, and therefore is acted upon only by the indirect action of the electric current.

If we place a piece of soft iron within a coil of insulated wire, and send a current of electricity through the wire, the iron becomes a magnet and attracts other iron as a magnet does. If, instead of placing a piece of iron within the coil, we place there a solution of any crystallizable substance, the action of crystallization will go on with great rapidity. The crystals will form three or four times as rapidly and much more perfectly than when the same solution is placed in the same temperature outside and beyond the influence of the electric coil. From these experiments we learn that the force, or whatever else it may be, within this coil exerts certain marked and important effects. That chemical action within the influence of the coil is much more marked and rapid than when that action goes on under natural conditions. But little attention has heretofore been paid to the study of the magnetic field of a coil of insulated wire. The matter is just beginning to attract attention.

Some two years since, Dr. Fraser placed some wine in this field, and carefully noted the results which followed. In doing this, he simply wound some insulated wire around a glass jar, and also around a small two-gallon cask. The wire was thoroughly insulated and wound as close as possible, the coils being closely pressed against each other.

The wine after remaining in these vessels from 30 to 40 days was found to have undergone a remarkable change. It had become "aged"—that is, rough, unpalatable, new wine, in 30 days of such exposure became soft and pleasant to the palate, and in every way tasted and appeared like wine which had been subjected to from one to two years "ageing" in the usual way. Here was a discovery, and a most important one, too. Right here it may be observed that quite a remarkable change also takes place in brandy and whisky under the same conditions.

After taking the wise precaution of securing patents for the discovery both in this country and Europe, Dr. Fraser called in his friends to witness and confer with him upon this important discovery. That conference was made up of some of our best wine experts, several well-known chemists and electricians and members of the press. All present expressed themselves much astonished and highly pleased with the experiment and its attendant results. The only questions of doubt were as to the manner in which the change was brought about—the chemistry thereof, and whether the improvement was a permanent one.

To solve these questions and to discover the exact chemical changes which took place in the wine, and also to learn what would be the result when the experiments were committed to other hands, Dr. Fraser called upon Mr. C. A. Wetmore, of the State Viticultural Laboratory, and Prof. E. W. Hilgard, of the Agricultural Department of the State University, with the request that they should repeat the experiments at their own laboratories, which they have done with the same results as have attended the experiments of Dr. Fraser. The reports of both these gentlemen were submitted to the public at the viticultural meeting above alluded to.

The Report of Prof. Hilgard

Is especially interesting and important, from the fact that close and careful analyses accompanied his experiments, which have brought to light the exact chemical changes which the wines treated undergo. We append the report:

For some months past, experiments on the process of maturing wines rapidly in the electro-magnetic field, as proposed by Dr. Fraser, of San Francisco, have been carried on in the Viticultural Laboratory of the University. The wines submitted to the treatment were mostly made in the laboratory itself, and therefore positively known to be pure. The process was carried on in three-gallon glass jars sealed with paraffine, and around which there was a double coil of insulated copper wire through which a current of from $\frac{1}{2}$ to $\frac{3}{4}$ ampere, generated by a constant battery, was circulated. To this influence the wine within the jars was exposed from three to six weeks at a time; the wine was analyzed at the outset, and samples of the same were kept in glass outside of the electro-treatment for comparison both by taste and analysis.

[The results are given in a carefully prepared table which it is not necessary that we should produce; but which are summarized as follows in the professor's report:]

The wine under treatment did not seem to deposit either more or less sediment than the sample left outside, untreated; and there seemed not to be, at any time, an appreciable difference as to clearness of the treated and untreated samples. Each time, after the second week, a notable difference in the "smoothness" of the samples on the palate began to manifest itself; it was always unmistakable after the third week, and the difference seemed to increase at least up to the fifth week. A comparison by taste indicated in every case a decrease of acidity and a more pleasant character of the acid, and the bouquet of a very much more mature wine became apparent.

Analysis of the treated wines shows almost throughout the following facts: A decrease of both acid and alcohol, indicating that a combination of the two into ethers has occurred, as in the natural maturing process. No appreciable change in tannin or color.

It thus appears that at least one of the processes that characterizes the usual process of maturing is very greatly hastened by the electro-magnetic treatment, and that an unmistakable improvement of the wine on the palate takes place. Whether the wine so treated is to be considered as similarly advanced in all other respects, remains to be determined by further experiments. But to the extent to which action has occurred, that action may be considered as permanent.

From the above report and from analyses long since made, it is a well-known fact that wine and all other alcoholic liquors, no matter how produced, are composed mainly of alcohol and water—the alcohol varying from 10 to 50 per cent of its volume. Also, that the characteristic bouquets and flavors are imparted by a variety of essential oils and other elemental ingredients, among which may be mentioned oil of cognac, fusel oil, gum, mucilage, dextrine, wax, glycerine, albumen, carbonic, tartaric, malic, citric, tannic, acetic and other acids, and a variety of delicate flavors derived from the grains and fruits from which the liquors are made. When liquors are new these essential oils, acids and other ingredients are mechanically mixed with the dilute alcohol, which gives to the liquor a raw, racy, and acrid taste and smell.

Heretofore, time only has been relied upon to age or ripen liquors by converting the essential oils into ethers. Various mechanical and chemical agencies have been tried to effect such a conversion, but without success, until the present discovery. Efforts have been made to age wines by extracting therefrom the supposed deleterious and unpleasant essential oils which they contain when they first come from the fermenting tub; but experience has proven that these essential oils cannot be removed without destroying the very essence which gives life and bouquet to the wine.

The True Theory.

And that followed by nature, is to unite—not to separate or remove them. Dr. Fraser employs one of nature's most powerful and effective agents to do in a few days what unaided nature requires many months, even years, to accomplish. Assuming the very probable theory that the natural ageing, or more properly blending of the component elements of liquors are brought about by terrestrial magnetism, in its naturally diffused condition, years of time are necessarily consumed in accomplishing the best results. The new process by concentrating those potent magnetic forces simply abridges time. By this process, which is simply an "induction method," no electrodes or wires are placed in contact with the wine and no currents of electricity are passed through it. It is simply placed under magnetic influence, in a peculiar manner, and the desirable chemical changes take place.

The changes being elemental, are therefore lasting. There can be no deterioration or "going back."

What It Will Do.

This invention promises to revolutionize the liquor industry of the world. In a few weeks of time it prepares all kinds of still wine, brandy and whisky for market, and makes them equal in every respect to the old. It prevents the usual loss by evaporation, which ordinarily amounts to 15 or 20 per cent. It saves from three to five years' interest on the original cost. It obviates a large outlay for barrels and casks, and also for vaults and buildings, and it saves all the labor and care usually bestowed upon liquors matured by age.

Its Benefits to California.

This scientific discovery comes at a most opportune time, to benefit one of the great leading industries of our State. Several millions of gallons of new and unsalable wine and brandy are now in store, awaiting the process of time to ripen for use. Stimulated by the certainty of a quick and profitable market for her wines, made possible by means of this new discovery, California promises eventually to rival France as a wine-producer. Her now unproductive foothills and mountain slopes will soon be peopled by industrious vine-growers, and the expression, "Vine-clad California," will be as familiarly spoken as "Vine-clad Italy."

From experiments already made it is estimated that, by the use of the "Fraser Process," every gallon of new wine produced in the State can be ripened and fitted for sale or use before the next crop comes in. It therefore obviates the necessity of carrying stocks for a period of three, four, or five years. It enables the wine-maker to turn over his money every year. By its use a large proportion of the expenses of maturing by age are saved, such as interest, insurance, cellar-room, cooperage, evaporation, labor and loss by handling.

What is Proposed.

That the wine interests of California may immediately make available this new discovery, the Fraser Wine Co., of California, has been incorporated. It has secured exclusive control of the Fraser patents for the State of California, and by their aid it can age all the wine and brandy produced in the State every year before the next vintage. Being organized, its purpose is to extend the benefits of the "Fraser process" to all wine producing sections of the State, so that every vinegrower and winemaker may be benefited thereby.

The New Game Law.

The game law of the State, as just enacted, is formed by amending Sections 626, 631 and 636 of the Penal Code, and reads as follows:

SECTION 1. Section 626 of an Act entitled "An Act to establish a Penal Code," approved February 14, 1872, is hereby amended so as to read as follows: 626. Every person who, in the State of California, between the 1st day of March and the 10th day of September, in each year, hunts, pursues, takes, kills or destroys quail, partridges, or grouse, or rail, is guilty of a misdemeanor. Every person who, in any of the counties of this State, at any time takes, gathers, or destroys the eggs of any quail, partridge, or grouse, is guilty of a misdemeanor. Every person who, in this State, between the 1st day of January and the 1st day of June, in each year, hunts, pursues, takes, kills or destroys doves, is guilty of a misdemeanor. Every person who, between the 15th day of December, in each year, and the 1st day of July in the following year, hunts, pursues, takes, kills, or destroys any male antelope, deer or buck, is guilty of a misdemeanor. Every person in the State of California who has in his possession any hides or any skins of deer, elk, antelope, or mountain sheep, killed between the 15th day of December and the 1st day of July, is guilty of a misdemeanor. Every person who shall at any time, in the State of California, hunt, pursue, take, kill or destroy any female antelope, elk, mountain sheep, female deer, or doe, shall be guilty of a misdemeanor. Every person who shall at any time hunt, pursue, take, kill, or destroy any spotted tawn, is guilty of a misdemeanor. Every person who shall take, kill, or destroy any of the animals mentioned in this section, at any time, unless the carcass of such animal is used or presented by the person taking or slaying it, or is sold for food, is guilty of a misdemeanor. Every person who shall buy, sell, offer, or expose for sale, transport, or have in his possession any deer, deerskin or hide, from which evidence of sex has been removed, or any of the aforesaid game at a time when it is unlawful to kill the same provided by this and subsequent sections, is guilty of a misdemeanor.

SEC. 2. Section 631 of the same Act is hereby amended so as to read as follows: 631. Every person who shall at any time net or pound any quail, partridge or grouse, and any person who shall sell, buy, transport or give away, or offer or expose for sale, or have in his possession, any quail, partridge or grouse that have been snared, captured, or taken in by means of any net or pound, is guilty of a misdemeanor. Proof of possession of any quail, partridge or grouse, which shall not show evidence of having been taken by means of other than a net or pound, shall be prima facie evidence in any prosecution for a violation of the provisions of this section that the person in whose possession such quail, partridge or grouse is found took, killed or destroyed the same by means of a net or pound.

SEC. 3. Section 636 of the same Act is hereby amended so as to read as follows: 636. Every person who shall set, use or continue, or who shall assist in setting, using or continuing, any pound, weir, set net, trap, or any other fixed or permanent contrivance for catching fish, in the waters of this State, is guilty of a misdemeanor. Every person who shall cast, extend or set any seine or net of any kind for the catching of fish in any river, stream or slough of this State, which shall extend more than one-third across the width of said river, stream or slough at the time and place of such fishing, is guilty of a misdemeanor. Every person who shall cast, extend, set, use or continue, or who shall assist in casting, extending, using or continuing, "Chinese sturgeon lines," or "Chinese shrimp or bag nets," or lines or nets of similar character, for the catching of fish in the waters of this State, is guilty of a misdemeanor. Every person who, by seine or other means, shall catch the young fish of any species, and who shall not return the same to the water immediately and alive, or shall sell or offer for sale any such fish, fresh or dried, is guilty of a misdemeanor. Every person convicted of a violation of any of the provisions of this chapter shall be punished by fine of not less than \$50 and not more than \$300, or imprisonment in the county jail of the county where the offense was committed for not less than 30 days nor more than six months, or by both such fine and imprisonment. One-third of all moneys collected for fines for violation of the provisions of this chapter to be paid to informers, one-third to the District Attorney of the county in which the action is prosecuted, and one-third to the Fish Commissioners' Fund of the State of California. Nothing in this chapter shall be construed to prohibit the United States Fish Commissioners or the Fish Commissioners of the State of California from taking such fish as they shall deem necessary for the purpose of artificial hatching, nor at any time. It shall not be lawful for any person to buy or sell, or offer or expose for sale, within this State, any kind of trout (except brook trout) less than eight inches in length. Any person violating any of the provisions of this section is guilty of a misdemeanor. The Board of Supervisors of the several counties of this State are authorized, by ordinance duly passed and published, to change the beginning or ending of the close season named in Section 626 of this Code, so as to make the same conform to the needs of their respective counties, whenever in their judgment they deem the same advisable.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SAMPLING APPARATUS.—Wm. Jones, S. F. No. 359,158. Dated March 8, 1887. This is an apparatus whereby thoroughly reliable samples of large quantities of materials, such as grain, cement, crushed ore, rock or other substances can be obtained during their passage to a storing floor or elsewhere.

STEAM ENGINE.—J. T. Kenworthy, Daniel Sexton and Albert Thompson, Colton, San Bernardino Co. No. 359,160. Dated March 8, 1887. The invention consists in the arrangement of cylinders and their connection with the crank-shaft, the valve chests and their valves and means for operating them, and their connection with the piston-rods. The object is to provide an engine adapted to be operated by steam, water or hot air, as may be most convenient.

STORAGE FLOOR.—Wm. Jones, S. F. No. 359,159. Dated March 8, 1887. This is a new and useful floor for storing quantities of materials, such as grain, cement, crushed ore, rock, etc. It consists in a floor which is composed of a number of independent movable pieces or strips laid close together upon suitable supports, and adapted to support the materials and by their movement to discharge them; in inclined plates within the compartment or room, and overlapping the ends of the movable strips of the floor, whereby a space is formed from which the materials stored upon the floor are excluded, thus affording opportunity for handling the strips of the floor; and in a mixing chute located below the floor.

COPYING-PAPER.—Emory I. Nichols, S. F. No. 359,170. Dated March 8, 1887. This consists in a piece or sheet of blotting paper saturated and coated slightly with a liquid solution of glue, water, ammonia, sugar and glycerine. In ordinary hectographs, one of the essentials is that the pad or impression-surface shall have the property of remaining moist. It must always remain moist and non-absorbent, which necessitates the washing off of the impression after an operation of copying has been completed. This new copying-paper does not remain moist, but has, on the contrary, to be frequently wet with water; but it does not have to be washed to remove the impression, as the whole of it will be absorbed by laying the sheet aside for a certain length of time. By not having to wash it, the inventor saves much trouble and inconvenience.

SASH-FASTENER.—Eugene Sherwood, S. F. No. 359,193. Dated March 8, 1887. The invention relates to the class of locks or fastenings applied to the sashes of windows for the purpose of fastening or securing them, whereby they cannot be opened from without, thus preventing an unlawful entry. It consists in a bolt seated on one sash and adapted to engage the other, said bolt having a rack stem, an operating pin, also seated in the first sash and influenced by a spring, said pin having a rack stem and a pinion engaged on opposite sides by the rack stems of both bolt and pin, whereby the movement of the latter effects a reverse or opposite movement of the former. The object is to provide a sash-lock which accomplishes its locking automatically, which can be readily released from within, and which will resist all tampering from without.

STATION INDICATOR.—Gerrit H. Bade, Austin, Nev. No. 359,121. Dated March 8, 1887. The object of this indicator is to inform passengers in railway trains or cars of the approach of the train or car to a station or street, and its name, as well as the names successively of all stations or streets which the car has to pass. It consists of a disk resembling a dial, placed within the car and provided with the names of the stations or streets successively, a band playing over the dial, a gong with hammer for striking it, power mechanism for operating the hand and hammer, and provided with an escapement mechanism, oscillating crank-shafts mounted on the car and connected with the escapement mechanism, and standards with arms located beside the roadway at proper distances on each side of the stations or streets, and with which the crank-shafts on the cars engage, whereby the indicator is operated.

BICYCLE.—James Brusie, Oakland. No. 359,127. Dated March 8, 1887. The object of this invention is to prevent those accidents known among wheelmen as "headers," and which result from any sudden stoppage of the machine, or unusual forward lurch of the rider, whereby the frame of the machine travels forward around its pivotal center on the axle, and thus carries the rider beyond the center of gravity. In this device a guard wheel is located forward of the main or large wheel, and there is an adjustable connection between the said wheel and the head or forks of the machine, by which said guard-wheel may be set in the desired proximity to the ground in front of the large wheel, or he raised up out of the way. When there is a tendency to a header, and the forks move forward on their pivotal center, the little guard-wheel is arranged to come in contact with the ground and stops the forks, whereby the header is prevented.



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SAN FRANCISCO:

Saturday Morning, March 26, 1887.

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Passing Events.

As will be seen from our mining summary, several quite rich mining strikes have been made recently, the notable ones of which are those of the Nevada County mine and the Divoll mine. The quartz mines of this State will make a good record this year.

Just at this time the manufacturers of this coast are quite anxious to know how the Interstate Commerce bill will affect their interests. The very large increase of through freight rates by rail between here and the East is bound to affect business on this coast. Some departments of local industry will be benefited, and others will not. The new rates will go into effect very shortly.

Active steps have now been taken to establish the Cogswell Polytechnic school, of which we spoke last week. The Trustees have been appointed, and it is stated that the school will be in operation within a year. An institution of this character will be of great benefit to the industrial classes on this coast.

Our larger cities are crowded with tourists and visitors from the East, and the interior towns are receiving accessions to population. On all sides—all over the State—are evidences of rapid growth and advance of values. This year will doubtless be a very prosperous one for California.

Preliminary Notices in Patenting Mines.

While the preliminary steps in taking up a mining claim, as far as legal requirements are concerned, are very simple and easily performed, those relating to patenting the claim are somewhat complicated—that is, they are to persons unaccustomed to such matters, and it is always best for miners to get proper legal advice before doing anything about procuring the patents. In either case, locating or patenting, miners cannot exercise too much care. If the claim turns out a valuable one, and the records are not all clear and correct, litigation is apt to ensue. This is particularly the case when patenting the claim. It is difficult and annoying enough, under the best of circumstances, to get mining patents through the Land Office Department. It costs too much and takes too long a time in any instance; but where there are any "hitches" of any kind, great expense and delay are incurred.

A decision in relation to the necessary preliminaries in mining cases has just been made in Washington. The Secretary of the Interior has decided the case of Bodis, Cal., mineral entry No. 17, made Dec. 1, 1883, by Henry Williams for the Great Western lode claims. He holds that the entry-man has complied with the law as to publication and posting of notices. Mr. Sparks declined to approve the entry for the patent, holding that the posting in the local land office did not cover the entire period of publication upon the entry; that if that publication is for a longer period than 60 days, the posting in the local office must cover the entire period of publication, although an identical period of 60 days may have been covered by the publication and posting of the notice in the local office. The Secretary says that when the notice is required to be given by different forms and modes to cover the same continuous period of time, a notice by either of the different modes will not run against an adverse claimant until the notice has been given by each and every mode and for the required time. Hence, as in this case, an adverse claimant does not take notice by publication until the notice is posted in the California office, as required by law. Although the publication may have commenced from the filing of the notice in the local office, the 60 days within which adverse claims were filed will be computed from the time the notice has been given by all the modes required.

The Hydraulic Miners Score a Point.

The suit brought by the city of Stockton against fourteen hydraulic mining companies, seeking to restrain them from further prosecuting their operations, has been dismissed as against all but one of the defendants, Judge Pressey, before whom the proceedings were had, finding that the natural wash and the plowing of the ground by the farmers contributed vastly more toward producing the mischief complained of than the operations of the hydraulic miners.

Had the bill relating to this subject introduced into the Legislature at its last session been passed by that body, the miners, under its provisions, would have been enabled to determine how far it would be possible for them to so impound and otherwise dispose of their tailings that they would cause little or no damage to any other interest. But despite the failure of that bill, the parties most interested in this issue ought to be able to get together and dispose of it in a manner which, if not wholly satisfactory to both, would avoid any very serious damage to either. Only in this manner can it ever be settled. Nothing, it would seem, can ever be hoped for through legislative action. How little litigation has done toward its determination has been seen. After a ten years' contest of this matter in the courts, it remains apparently as far from a settlement as at first, for the miners, encouraged by this late decision, will be apt to keep up the fight, which in any event they probably would have done. Only in friendly conference, and by exercising a spirit of moderation and compromise, can this trouble be adjusted and finally disposed of, each party to the controversy being willing to concede something, and, if necessary, suffer quite a good deal.

It is stated that the Spring Valley mine, Cherokee Flat, Butte county, will be started up again and run in the interest of the miners,

The Cogswell Polytechnic College.

We mentioned last week that steps were being taken by Dr. Henry D. Cogswell to establish a polytechnic college in this city. On Saturday last he deeded large realties, roundly valued at over \$1,000,000, to a Board of Trustees, for the purpose of establishing and maintaining in the city of San Francisco a polytechnic college, which shall snailish Californian boys and girls over the age of 14 years to acquire a practical training in the various industries by which it is possible to make an honorable and comfortable living.

In addressing the assembly of friends called to witness the transfer, Dr. Cogswell said:

"The education that does not prepare one to intelligently direct his labor is not worthy of consideration. We are sorry to say but little effort is made in our present system to prepare children to use their knowledge in assisting them to gain a livelihood. Most of our boys and girls have no occupation and are not fit for one when they leave school. They have learning, but no capacity. The time has come when this should be changed. The nineteenth century calls for the training of the eyes and the hand, and stamps it as just as important as the study of grammar, geography, and arithmetic. Educated working men and women are necessary to solve the great labor problems that will arise in the future. For the purpose of this education there is room and need for technical schools in all quarters of our country. Mental industry can exist only along with physical industry; hence the true school should give both mental and physical culture. For the purpose, then, of providing the boys and girls of the State with a thorough training in mechanical arts and other industries, we have made the grant, as set forth in these papers, providing for the founding and maintaining of the Cogswell Polytechnic college. I present them to you, believing that you will faithfully execute your trust to the best of your ability."

The trustees named in the trust-deeds are Moses Hopkins, Charles B. Stone, H. D. Cogswell, Caroline E. Cogswell, Mrs. E. M. Arnold, James G. Kennedy and Thomas B. Bishop. The deeds contain a condition that the trustees establish and maintain the school according to the idea of the donor, and provide that they shall not sell nor mortgage the property, but shall support the college from the revenues derived therefrom. Dr. Cogswell also proposes to give the trustees \$60,000 in cash, wherewith to commence operations and erect suitable buildings.

The trustees, all of whom were present, accepted the trust, and pledged themselves to carry out its provisions.

On Monday the trustees elected Dr. Cogswell president, Mrs. Arnold secretary, and Mr. Stone treasurer, and appointed a Committee on By-laws.

Chas. Geddes, the chosen architect, is already at work upon the plans of the buildings, which will be at Twenty-sixth and Folsom streets. We refrain from giving further details to-day as to the elaborate structures and courses of study proposed; and will merely add that the trustees hope to have the school actually open by January 1, 1888, with accommodations for 200 pupils at the outset.

A New Amalgamator.

Frank A. Huntington, the designer and manufacturer of the Huntington ore mills and crushers, has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency an amalgamating pan constructed quite differently from those commonly in use. The pan or tub may be made square, oblong, or of other polygonal form which will form angles and inter-ruptions sufficient to prevent the material within the tub from being carried round and round by the action of the stirrers. These stirrers consist of propeller-shaped blades secured in pairs on vertical shafts, the pieces being so bent that the upper and lower blades upon each shaft have their pitch in opposite directions. This causes the complete agitation of the pulp in the pan, bringing all parts of it into intimate contact with the mercury in the bottom of the tub and preventing it from settling, while the angular form of the tub prevents a smooth rotary current being established on account of the centrifugal action. The tub or pan is also provided with one or more shelves at each corner, upon which the pulp is thrown during the rotations of the propellers.

Mr. Huntington states that he finds it preferable to employ two or more of the vertical shafts, which, if the pan is rectangular, may be

arranged in line, or, if made triangular in shape, would be placed similarly with reference to each other. These shafts are suitably journaled and extend upward so their driving pulleys at their upper end may be driven by a single belt.

The supporting boxes of the pulleys are secured to a frame which is supported from a central shaft extending down through the bottom of the tub, and having its step upon a lever by which it may be raised and lowered, thus raising the propellers, which is necessary in order to free them from the sand and heavy material that would settle about the lower ends when the apparatus is stopped. By thus raising the propellers temporarily when the machine is started, they will soon agitate the whols of the material and loosen it up again sufficiently to allow them to revolve freely, when they may again be allowed to sink to the usual position.

Foundry Notes.

The building of new and extension of old cable roads will no doubt keep the Pacific Rolling Mills busy in furnishing yokes and other material.

The increase of our coasting trade and the building of new vessels is greatly benefiting our local foundries. At the Fulton Iron Works they are now building no less than ten marine engines. Most of these are for the steam schooners which are now running to and from the lumber landings on the coast. They do not rely on steam alone, and the engines may be considered auxiliary. They steam up the coast and make their landings, but sail back with the strong and favorable winds of summer. In case of a head-wind, or in making their landings, steam is used.

The Pacific Iron Works are at work on some dredging machinery plans for the Carson river dredging enterprise. At these works they are also making some appliances for the new process of Dr. Rae, for utilizing electricity in the prevention of loss of mercury and amalgam in silver mining on the Comstock.

At the Union Iron Works they now have between 800 and 900 men at work. About 200 of these are in the various departments of the shipyard. The keel of the new cruiser will be laid in about a month, and preparations are being vigorously carried out for work on the vessel. In the shipyard the largest piece of work in hand is the repairs to the Pacific Mail iron steamer San Pablo, which is being fitted for the passenger trade with China. An additional deck has been put in, making four, and raising the depth of the vessel nine feet. The new dry dock is nearing completion. A massive iron framework, 435 feet long and 65 wide, is in place, which will be settled in the water until a steamer will float over it, and then raised high and dry, vessel and all, by powerful rams. Among the large jobs lately done in the machine-shops is a double pumping apparatus for the Spring Valley Water Works, and a 60-stamp mill for Butte, M. T. The mill is completed, but will not be shipped before May or June.

Frank Huntington, the manufacturer of quartz-working apparatus, has made and sold 17 of his Huntington mills so far this year. Two 3½-foot mills have gone to Eureka, Nevada; one 5-foot one to E. Probert; one 3½-foot to the Treadwell mine, Alaska; four 5-foot to the Manhattan Mining Co., Austin, Nev.; one 3½-foot one has been sent to Sydney, and one 5-foot one to White Oaks, New Mexico. Mr. Reilly, who recently purchased the Bell & Hopping mine, Shasta Co., has concluded to increase his crushing capacity by the addition of one 6-foot Huntington roller mill. This additional mill is considered equal to a 15-stamp battery.

A Curious Outburst.

The town of Baku, Russia, was recently threatened with destruction by the sudden outburst of a natural naphtha fountain. This was soon followed by a volcanic eruption from Lok Botan, close to the Ponta railway station, and about ten miles from Baku. When the eruption began, the inhabitants of Baku were alarmed by a shock like that of an explosion, which made all their window-panes tremble violently, while toward the south-west the sky was illuminated by an intense light, as of some terrific conflagration. The following in-

formation was furnished by the railway officials of the Ponta station:

"Quite suddenly at 11 o'clock at night, the noise of an explosion was heard, and the summit of Lok Botan shot up an enormous column of fire some 350 feet high. The whole country was instantly lit up brighter than day, and the heat could be felt at nearly a mile from the crater. There was scarcely any wind, so that the column continued to ascend quite vertically, carrying with it, as could be seen, large dark substances which appeared to fall again into the volcano. This lasted, with short intervals of subsidence, all through the night and the following 24 hours; but, luckily, the matters ejected did not reach the railway station." The volume of muddy liquid thrown out is estimated at half a million cubic *sojenes*—the Russian *sojene* equalling 7 feet—and has spread itself over more than a square mile to a depth of from 7 to 14 feet.

Atomizing Sulphur.

Henry L. Lightner, of this city, has patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, a device for reducing and atomizing sulphur, by the application of steam or heated air. The sulphur, in a crude or any suitable form, is put in a funnel-shaped hopper or receiver, around the exterior of which is fitted a jacket, into which steam is admitted from a boiler. The steam is preferably admitted at the upper end of the jacket, and the lower end is connected with the boiler by a pipe, so that the water of condensation will be returned to the boiler without other mechanism.

The lower end of the cone or receiver has a passage and a valve by which the flow of the material from the receiver is regulated. A horizontal tubular chamber is fixed to the bottom of the discharge tube, and upon one end is a conical or contracted nozzle, through which the material passing from the receiver into the chamber may be discharged. In the opposite end of this chamber a tube is led from the boiler, and the tube or connecting-nozzle extends forward to a point near the discharge-nozzle of the outer chamber.

The steam from the boiler entering the chamber around the receiver melts the sulphur placed within it, and at a pressure of about 60 pounds of steam, the temperature is sufficient to reduce the sulphur to a liquid and easily flowing condition. It passes downward from the receiver through the regulating cock into the exterior chamber, and from there is blown out by a jet of steam or hot air, in the manner of an injector, being reduced by this action to an extremely fine and impalpable powder, which is at the same time chemically pure. The atomizing of the sulphur by the blast is the essential feature. The inventor says it may be applied directly to vines or plants where it is necessary to use sulphur as a dressing or application, by having a small boiler and apparatus which can be carried around through the field for this purpose. F. A. Huntington owns a half interest in this invention.

Academy of Sciences.

The regular semi-monthly meeting of the Academy of Sciences was held on Monday evening last, President Harkness in the chair. A curious piece of sandstone, having the impression of a fig-leaf upon it, and obtained in San Diego county, was presented by John Dolbeer. Mr. Alexander Lee presented rare specimens of octopuses.

Mr. F. L. Clark gave a description of the recent eruptions of Mauna Loa, Sandwich islands, and exhibited photographs made during the recent outbreak of the volcano.

The following papers were read by title for publication: "The West Coast Pulmonata Fossil," by J. G. Cooper; "Occultation of the Stars," by Geo. Davidson; "Pacific Coast Fungi," by H. W. Harkness.

Specimens of rock from the great pyramid in Egypt were presented, and the President described at some length the quarries from which the rock to build them was taken.

Mr. Chas. G. Yale, who has been Secretary of the Academy for the past 16 years, tendered his resignation, which was accepted and a vote of thanks passed to him for services rendered. The resignation of C. Troyer, the Librarian, was also presented, but action was deferred to the next meeting. These two officers were the

only ones of the old Council who were re-elected at the recent annual election of the Academy.

Mining Accidents.

Pet King, a well-known resident of Gold Hill, was badly cut about the head last week, by a rock falling upon him, while at work in the Yellow Jacket mine.

A man named M. Javaux, employed in the Sheep Ranch mine, Calaveras county, met with a shocking death last week. He was at work in the mine and had gone to the station in the shaft for a pick. On his return he met the car in the level. On one side of the track there is ample space to permit the car's passing without injury to any that may be coming in, but upon the other side the space is not sufficient. It happened that the unfortunate man turned to the wrong side of the track, and the car caught

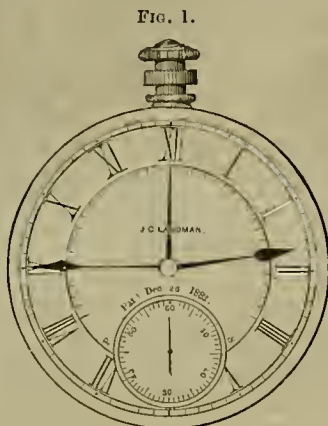


FIG. 1.

J. C. LANDMANN'S WATCH REGULATOR.

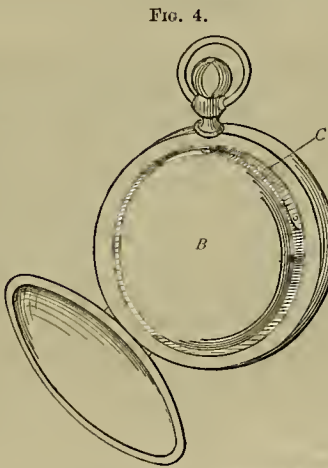


FIG. 4.

Improved Watchcase and Watch Regulator.

J. C. Landmann, of Eureka, Nevada, has patented an attachment for regulating the speed of watches, so that the adjustment can be made without opening the watch. Fig. 1 of the engravings shows the face of an ordinary watch, with the supplemental hand or arm for connecting with the internal gears for adjusting or regulating the speed. Figs. 2 and 3 shows the internal construction.

If the rate of speed at which the watch is running is to be altered, it is done from the face without opening the back part of the watch, by moving the hand or arm on the face. This operates the gears and pinions shown, which are suitably connected with the regulator arm, so that the desired change is made.

The improved watchcase is shown in Figs. 4

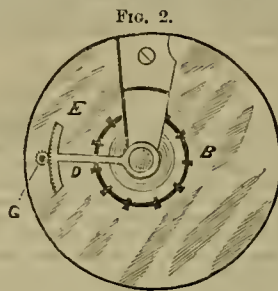


FIG. 2.

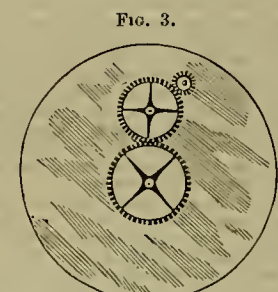


FIG. 3.

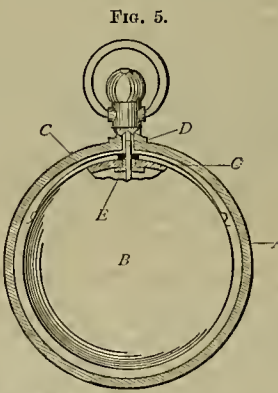


FIG. 5.

LANDMANN'S WATCH CASE.

une point of the pick which he carried in his hand and thrust the other clear through his body, causing death shortly after. Javaux had been working in the mine for a number of years, and was a man respected and esteemed.

Dan McAllen met with a painful accident Friday of last week while working in the Union mine, Calaveras. He was working in a stope about 14 feet above one of the levels. In attempting to turn a piece of slate over, his hand slipped and he fell backward to the level below. In falling, he went head first, and, striking his right shoulder on a timber, was turned partly around. When he reached the bottom of the drift he struck on his right side on a large piece of slate rock and broke two of his ribs.

Joseph Perola was killed in the Lane mine, Calaveras county. At the time of the accident he was at work digging with a pick. A blast had just been set off, and in loosening a boulder a mass of rock and timber came down and crowded him off the bench into the chute. He fell about 40 feet, and then rolled and tumbled to the bottom, about 30 feet, over the mass of rock and dirt that had been thrown into the pit. He was taken out in a few minutes, but he never spoke after he fell.

and 5. Fig. 4 is the watch open from the rear so as to show the interior. Fig. 2 is the back of the watch, with a portion of the inner case broken away, showing the improvement. The design is to protect the movement of the watch from injury in case of its being dropped.

A is the exterior case of the watch, and B is the secondary or interior case, within which the movement is to be contained. This secondary case is made of considerably smaller diameter than the interior of the outer case, and it is so held that it does not have actual contact with it by means of a spring, C, which has its center secured above the top of the inner case, its ends extending outward and passing part way round, so as to press against the sides of the case.

D is the stem by which the watch is wound up, and this extends down through the center of the spring and into the inner case, where it is connected with the winding mechanism in the usual or any suitable way. Around this stem is fitted a washer or collar, E, which is made to fit closely, and may be further secured with an elastic gum or rubber, so as to allow the movement of the interior case within the outer one without making any opening or a loose joint at this point. By this construction the movement is secure from injury by blows or falls,

and the balance-staff pivots are safe from accident, because the force of the fall is broken on account of the loose movement of the inner case and the elastic spring upon which the force of the blow is expended. Mr. Landmann desires to sell these patents together, as a whole. He may be addressed for further information as above.

In Fig. 2 is shown the balance-wheel, B, hair-spring, C, and regulator-arm, D, in the usual position. The arm, D, is made stronger in this invention than in the ordinary construction, as it has to carry the segment of a circle, E, the periphery of which is formed into a toothed rack, as shown. Through the inner case of the watch a shaft passes, and has a pinion, G, on its end, so as to mesh or engage with the rack. By the gearing shown in Fig. 3, the hand or arm in the face or outside of the watch operates this gear, G, by which in turn the regulator is operated, as described.

The Interstate Commission.

The President, after long deliberation, has announced his list of commissioners under the Interstate Commerce Act, as follows: Theo. M. Cooley, of Michigan, six years; Wm. R. Morrison, of Illinois, five years; Ang. Schoonmaker, of New York, four years; Aldace F. Walker, of Vermont, three years; and Welter L. Bragg, of Alabama, for two years. Morrison, Schoonmaker and Bragg are Democrats, Cooley and Walker, Republicans. It is claimed that the interest of the railroads is well represented on the commission.

Rumors are rife of material advance in interstate freight rates, and shippers of various kinds of produce are anxious as to the effects upon the material they handle. The Sacramento Bee has gained an intimation of what may occur in rates which we give, on the authority of that journal:

The following is a partial list of freight rates to go into effect on April 4th, when the Interstate Commerce Act will be in operation:

Between California Terminals and					
	1st.	2d.	3d.	4th.	5th.
Missouri river, .	\$4 00	\$3 50	\$3 00	\$2 50	\$2 25
St. Louis, .	4 50	3 85	3 20	2 65	2 35
Chicago, .	4 70	4 00	3 25	2 75	2 45
Denver, .	3 00	2 65	2 30	1 95	1 70

Between California Terminals and					
	A.	B.	C.	D.	E.
Missouri river, .	\$2 10	\$1 75	\$1 40	\$1 10	\$1 00
St. Louis, .	2 20	1 85	1 50	1 20	1 10
Chicago, .	2 30	1 95	1 55	1 25	1 15
Denver, .	1 50	1 20	95	85	80

There is a special tariff on the following articles from and to California points and the Missouri river: Beans, \$1.40 per 100 pounds; borax, \$1.10; canned goods and strained honey, \$1.40; hops, \$1.75; whale, fish and cocoa oils, \$1.10; vegetables, \$1.00; barley, 65 cents; wire, \$1.90; and oranges, per 100 pounds, \$1.00.

The classification under this tariff is very different from that hitherto in vogue, so that it is difficult to say just what the increase will be on any given kind of freight. But the new rates are known to be much higher than the old—in some instances four or five times as much.

This is the tariff as revised by the Joint Western Classification Committee, January 1, 1887. It divides all freight that may be shipped into ten classes, running from 1 to 5 and from A to E inclusive. Its object is to enable the present "short-haul" rates to be maintained undisturbed by the new law. Another tariff has been framed for submission to the Interstate Commission, but it may be 60 or 90 days before any action can be had upon it. This proposed tariff is much lower than the one agreed upon to go into effect on April 4th. Under a liberal interpretation of the law, the lower tariff could be adopted.

Of course, if rates are much raised, the competition by clipper ship and by Panama will come into operation, and much of our produce can go that way.

LARGE ENGINES.—An English firm is engaged in constructing large compound engines for the new Italian armor-clad *Il Re Umberto*. According to the contract, these engines are to be of 19,500-horse power, which is 7500-horse power more than that of any vessel yet designed for the British Navy. It is stated that they will actually indicate 21,000-horse power, or 9000 more than any vessel in the British Navy. These engines, completely made of steel, are expected to drive the *Il Re Umberto*, fully equipped, about 20 knots an hour.

LENSES which magnify, and yet are perfectly flat on both sides, have been constructed by Schott & Co., of Jena, the manufacturers of Abbe's optical glass. These lenses are mere curiosities. They consist of single disks of glass, such that the refractive index decreases in a regular manner from the surface inward.

See advertisement elsewhere "TRAVELING AGENTS WANTED."

MECHANICAL PROGRESS.

A Compound for Treating Steel.

A patent was issued in May last for what is called "Schaefer's Compound for Steel." The compound consists of resin, linseed oil, glycerine and powdered charcoal, heated and intimately mixed in the proportion stated in the specification. It is used by heating the steel to a clear red heat and immersing and coating it in the compound, and the steel is afterward reheated and hardened in the usual manner by quickly cooling it.

The *Journal of the Franklin Institute* refers to it as follows: "Barned cast steel is restored to its original condition, and the softer grades of steel acquire the properties of cast steel, by being treated as above stated. Tools made from Bessemer steel, which is incapable of being hardened, are, after treatment with this compound and hardening, capable of cutting cast steel."

Tools so treated possess a greater durability than before, and are capable of cutting castings which resist the best of ordinary cast-steel tools.

The grain of steel exhibited by fracture of tools so treated, as compared with the same material before treatment, shows a difference analogous to that between the fine cast steel and coarse or blistered steel.

The compound applied to gray castings and malleable iron castings imparts a degree of hardness to them superior to ordinary case-hardening.

It is not attended in use with the unpleasant and deleterious fumes incident to case-hardening compounds containing hydrocyanic acid, and is much less expensive.

Specimens of different materials in their normal state, and also as treated with this compound and hardened, were submitted to the members of the institute, properly labeled, which conveyed a clearer conception of the effect than could be stated in language.

In order that the facility of application and its effect may be seen, a forge, with fuel and bars of steel, and other metal and a supply of the compound, were submitted, by means of which the members who felt inclined personally tested it after the close of the meeting.

The compound has been introduced into practical use in many manufacturing establishments in this city, with uniformly satisfactory results.

The Double-Belt Question.

We recently gave a short paragraph from an exchange on the practicability and economy of using a double belt instead of a single wider one to secure any desired power. A correspondent of the *Mechanical News*, in alluding to the use of double belts, says: "In regard to running one belt on the top of another, the inside belt has to carry nearly all the load, the outside belt being only a tightener to press it against the pulleys. Both sides of the inside belt are subjected to about equal friction in carrying the load. However anomalous it may seem, the outside belt runs faster while going around the pulleys than the inside belt, occasioning some slipping between the two, in the direction to bring an undue strain upon the inside belt." In referring to a particular case the correspondent says: "Instead of his outside belt being 'a great deal the tightest,' it should have been a great deal the loosest. The outside of the outside belt (being of canvas and covered with rubber) wouldn't stretch while over the pulleys—its inside must upset in bending; consequently it was slipping ahead of the inside belt, occasioning its destruction as well as loss of power."

Still Another

Remarks as follows: "The power that is applied to the pulley has to be resisted by the inside belt adhering to the face of the pulley, and as it is three and one-seventh times the thickness of inside belt farther around the pulley for the outside belt to travel, and the outside belt has the outside grip and the power of the engine to help, it is natural to suppose that it will hang to that grip and stretch the inside belt three and one-seventh times its thickness every time round the pulley. All the mercy the inside belt can get is while it is passing from one pulley to the other, when it has to undergo the same process of stretching, which will make the best belt in the world yield in a short time, and the outside belt is of no use whatever, only as a matter of heft. The smaller the pulley the greater the strain in a given length of the belt; therefore I would not advise a double leather belt to be run on very small pulleys. It is better to increase the width, or even to run two sets of pulleys and use two single belts, than to have the belt too thick on small pulleys, for a pulley that is three feet in circumference strains the outside of a belt just as much in the three feet as one twice that size would in six feet."

LAST DAYS OF THE STEAM ENGINE, POSSIBLY—ELECTRICITY NEXT.—The steam engine has been coming in for some disparagement from the late discussions of the British Association. According to some leading members of the body, the steam engine has had its day; its part is played. It will before long, we are assured, be seen only at museums. It is needless to say, however, that the scientific men of the British Association do not speak lightly of the steam

engine for the same reasons which induce Mr. Ruckin to condemn and denounce it. Mr. Ruckin objects to all inventions and appliances which bring crowds of uncultured persons to interfere with the meditative seclusion of the cultured few, or the cultured one; which enables rude, inquiring tourists to roam over hillside and lakeside, and to "spoil for him the earth and skies." The scientific men object to the steam engine and talk lightly of it because they think it is not up to the work which the age requires; because it expends too much force with too little result. They want a better force than that which drives the steam engine; more locomotion, quicker motion, quicker travel, involving, of course, greater diffusion than ever of the uncultured among the scenes hitherto claimed by some as sacred to the cultured. For ourselves, we have no rooted prejudice in favor of the steam engine. We are quite willing that it should go, if only something better, swifter, safer and less noisy should come to take its place. It had its merits, undoubtedly, and was a very useful piece of mechanism in its day. But if its day be done, we are quite ready to welcome the coming guest and speed this parting one to its place in the South Kensington museum.—*Ex.*

Iron and Steel vs. Wood.

At a late meeting of the South Staffordshire (Eng.) Institute of Iron and Steel Works' Managers, a paper was read by one of the members, entitled: "Some Suggestions for the Development of the Iron Trade by the further use of Iron and Steel vs. Wood." The paper contained several hints which might be profitable for consideration in this country as well as England. It explained that every ton of iron or steel which could be used in lieu of wood must be a great saving or gain to the country. Iron practically represented so much labor expended. Without going into close calculations, it was reasonable to say that one ton of iron, at £5, meant £4 or more actually paid in wages. It was, of course, an undoubted fact that there had been in the past a great development in the iron trade by the gradual use of iron instead of wood, and there was, no doubt, a very large field still open for further substitution, such, for instance, as in buildings, boxes and packing cases, barrels or casks, carriages, carts and other vehicles, furniture, farm buildings, fencing, pit frames, railway work, sheds, signal-boxes, telegraph poles, etc. With regard to buildings, much had been done by the adoption of girders, beams, pillars, shutters, etc., to say nothing of the numerous forms of galvanized iron buildings; but there must still be room for inventive brains.

Our neighbors in France had recently invented hollow iron window frames and doors—which were said to be light and strong and of greater durability than could ever be predicted of wood. Some few years since an attempt was made with a patent metallic box for tin plates, but owing probably to some defects it was never adopted. If a suitable sheet-iron box could be generally used, it was estimated that the consumption of iron in boxes to cover our present output of plates would be something like 10,000 tons a year. In such a box or cover there would be advantages to foreign if not to home buyers, for it was well known that wooden boxes arrived in foreign ports in a very bad condition, and could only be used for firewood, whereas iron, in the shape of pieces of steel or scrap, was always salable. Iron barrels or casks were largely used, but here again was room for extension and development. There was no reason why corrugated barrels of iron or steel should not be used for liquors, since milk and preserved fruits, and other articles of food, were kept in cans. Steel was finding much favor among the carriage-builders, but there was still much prejudice against the metal being used in the manufacture of furniture. Iron was already extensively used for fencing, and it was hoped that when the railway companies renewed their miles of fencing they would substitute iron or steel for wood.

The general adoption of steel sleepers would certainly do good, as would also the employment of iron and steel in the manufacture of railway wagons. There were, indeed, a few plate-iron trucks in use, and there were several important advantages in their construction which might well be considered. It was noticeable that even in the present day of galvanized-iron buildings our railway companies still erected wooden sheds, signal-boxes, etc., which might be both profitably and economically substituted with iron.

MANUFACTURED IRON.—There appears to be no abatement in the demand for some forms of finished iron, and at no time since the war has there been such a demand for bar iron as at present. The mills are receiving inquiries from quarters heretofore never supplied by them, showing that the usual sources of supply are all overcrowded. Structural iron is also in fair demand. Dealers say that the prospects for a prosperous spring and summer trade in building forms of iron grow better every week, as the difficulties between the building contractors and their men are being rapidly settled up. Tank and plate iron are being called for in large quantities from nearly all quarters.

THE STRENGTH OF NAILS.—Experiments have proven that a nail is able to lift and draw, perpendicularly, nine times its weight. It will drag, horizontally, on a smooth surface of wood, 50 times its weight.

SCIENTIFIC PROGRESS.

How the Thistle Travels.

There is no weed more ubiquitous than the common thistle. In paradise, it is true, if we may trust John Milton and the Sunday-school books—wise, as usual, beyond what is written—there were no thorns or thistles, the creation and introduction of the noxious tribe upon this once innocent and thornless earth being a direct consequence of the fall of man, and a stern retribution for Adam's delinquency. But since then the thistle has managed so to diffuse itself over the habitable globe that there hardly now remains a spot on earth without its own local representative of that ever intrusive and conquering genus. Wherever civilized man goes, there the thistle accompanies him as a matter of course in his various wanderings. It adapts itself to all earthly environments. Close up to the Arctic Circle you find it defying the indigenous reindeer with its prickly wings; under an equatorial sky you may observe it accommodating itself most complacently, with a sardonic smile, to tropical existence, and battling with the prickly cactuses and the thorny acacias, to the manner born, for its fair share of the dry and arid uplands. Even natterles are nowhere in competition with it; in spite of its valuable and irritating sting, the nettle has not the plasticity and adaptability of constitution that mark the stout and sturdy thistle tribe. Garnered and harvested yearly with the farmer's corn, its seeds have been gratuitously distributed by its enemy, man, in all climates; and, when once it gains the slightest foothold, its winged down enables it to diffuse itself ad infinitum through the virgin soil of yet unconquered and untithed continents. A field of thistles in England itself is a beautiful sight for the enthusiastic botanist (who has usually a low opinion of the agricultural interest); but in the fresh and fallow earth of New Zealand they attain a yet more prodigious stature, that might well strike awe and dismay into the stout heart of a Berkshire farmer.

The fact is, this thistle is one of those bell-cose plants which specially lay themselves out, in the struggle for existence, for the occupation of soils, where they are compelled to defend their leaves and stems from the constant attacks of the larger herbivores. On open plains and wide steppes, much browsed over in the wild state by deer or buffalo, and in the degenerate civilized condition by more prosaic cows and donkeys, one may always note that only the prickliest and most defensive plants have any chance of getting a livelihood.—*Popular Science Monthly.*

TASTE AND SMELL—TWO SENSES, EACH USELESS WITHOUT THE OTHER.—Scientific men inform us that we can distinguish only some six varieties of substances by taste. These are the bitter, sour, sweet, saline, alkaline and metallic. Others enumerate simply the sweets and bitters, acids and salines as the four varieties of flavors we are able to distinguish. The rapidity with which different substances may be perceived and appreciated by the sense of taste varies greatly. For example, salt ranks highest on this list. It can be tasted in 0.17 of a second after its application. Quinine, with a much more persistent flavor, requires but 0.258 of a second for its appreciation by taste. Bitters do not rank highly in this matter of food appreciation. Sours and sweets come certainly within the range of taste. We have acquired a habit of referring every sensation about the mouth to taste, whereas, in reality, it is argued by the *London News*, smell has more to do with the matter than is really believed. Even in the case of sweets and sours, it can hardly be denied that these are to be distinguished more by a combination of smell, taste and touch than by taste alone. Again, we discriminate degrees of coarseness by smell in a ready fashion, and such degrees may be tested and distinguished by the more delicate smell when taste lags woefully behind in the work of discrimination. Perchance it is the pure sweet savor that taste has the right to assume as its especial province. Yet "lengthened sweetnes long drawn out" will soon weary the palate unless it is linked to some other flavor in the distinction of which smell may play a part. Children will weary of plain sugar, while the flavored candy attracts them more powerfully; and this is a proof of the argument that it is to smell and to its aid in tasting that the higher sense of gratification is due.

FREEZING MERCURY IN A RED-HOT CRUCIBLE.—We take from an exchange the following account of an experiment recently performed at the University of Wooster by Prof. W. Z. Bennett: Carbon dioxide was generated in a cylinder of Bessemer steel under a pressure of 3000 pounds to the square inch. From thence it was allowed to escape into a condenser in the condition of solidified gas, resembling snowflakes in appearance. The temperature of this solidified gas is 168° Fah. below zero. A small quantity of this gas was then gathered and pressed into a so-called "snowball," on one side of which was a small depression. The ball was placed in a red-hot crucible, upon which the intense heat of a Bunsen burner was playing. A little mercury and ether were dropped into the depression on the "gas ball," and notwithstanding the intense heat, the mercury was immediately frozen. Professor Bennett then advanced one step higher by setting the

ether on fire, but still was enabled to pick out the frozen bulb of mercury. An instance of this last step in which mercury was frozen in a flame, as well as over a red-hot crucible, has never been recorded in science, and was perfectly original with Professor Bennett.

Economy in Gas Consumption.

A very important consideration in burning gas, affecting safety as well as economy, is in securing a uniform pressure at the burner, and a pressure which scientific research has established as the most economical. Without a special regulator, uniform pressure is impossible, as the pressure varies with the number of burners drawing from the main, which number is constantly varying. The elevation of the burner, whether at the top of a high building or in the basement, is also an important factor in the pressure.

A decrease of pressure in the gas company's mains is an important economy to the company, as the lowest pressure is attended with the least loss from leakage. The general average of leakage from mains is about 17 per cent of the gas made. A five-foot burner will consume, under a half-inch of water pressure, seven feet per hour; under a one-inch pressure the same burner will consume 11 feet per hour; under two inches 16 feet, and under three inches 20 feet. From these figures the reader will readily see the loss or gain in gas consumption from variations of pressure.

The point of pressure which scientific investigation has determined to be the most economical is half an inch, when the piping is properly put in and arranged. Perfect regulation is claimed for a great number of devices—for all, indeed; but none of these devices do it for any considerable length of time. When first put in and tested they generally do all that is claimed for them; but after the gas has passed through them for awhile a sticky sediment is formed upon the self-regulating valves which prevents their proper working. No matter how perfectly made and finished, they will get "sticky" and won't regulate; and as a general thing the finer the valve-seats are finished, the quicker and the worse they will stick. This gas tar, as it is called, is what plays the mischief with the regulators. Frequent cleaning is the only remedy. If you decide to buy a "regulator," insist on having it tested, and don't let this test be made until it has been used for five or six days at least. There is quite a difference in the working of different regulators. Some are, beyond question, much better than others, and good judgment and careful tests should be made as above before final purchase. A good regulator that works fairly well and is frequently cleaned, will undoubtedly make an important saving in the ordinary burning of gas.

PENETRATING POWER OF LIGHT.—If it were possible to rise above the atmosphere which surrounds the earth, we should see nothing but an intense and sharply defined ball of fire, while everything else would be wrapped in total darkness. There could be no diffusion of light without an atmosphere or some similar medium for it to act upon. This would undoubtedly be the case to an observer on this moon. The moment the "sun goes down," upon the moon intense darkness prevails; there is no twilight there, because the moon has no atmosphere. If the air around us upon the earth extended to a height of 700 miles, the rays of the sun could not penetrate it, and we would be left in darkness. At the depth of 700 feet in the ocean the light ceases altogether, one-half of the light being absorbed in passing through seven feet of the purest water.

BALLOON ELECTRIC SIGNALING.—In a paper just published in *Nature*, Mr. Eric S. Bruce, the English inventor of the balloon for signaling by the electric light, announces that he will soon put his invention to the most rigorous of tests—signaling across the English channel at Dover. Mr. Bruce's balloon is made of a perfectly translucent material, filled with hydrogen or coal gas, in the interior of which are placed several incandescent electric lamps. The lamps are in metallic circuit with a source of electricity on the ground. In the circuit on the ground is an apparatus for making and breaking contact rapidly, and by varying the duration of the flashes of light in the balloon it is possible to signal by the Morse or any other code.

TEMPERING BRASS.—Brass cannot be tempered in the manner in which steel is tempered. Hence the only method to make a brass spring is to compress the metal either by roller or by hammering. If the springs are to be flat, hammer them out to shape from soft wire or sheet brass somewhat thicker than the finished spring is to be. If the brass shows a tendency to crack in hammering, it must be annealed, which must be done by heating to a light red and plunging into water. In hammering, use a light hammer, but do not spare the blow.

A BOTANICAL phenomenon in which the people of Leominster, England, take pride is a pair of trees—an oak and an ash—which appear to have but a single trunk. They grow together for about four feet and then divide.

COMETS.—According to Prof. Young, 600 comets have been discovered since the beginning of the Christian era.

ENGINEERING NOTES.

New Cable System for Street Railways.

What is claimed to be most successful experiments have recently been conducted in Chicago with a new cable system. The following sketch of the system is taken from a recent issue of the *Chicago Times*:

The cable is carried in a 6-inch square slotted tube or box of iron, which rests on the same cross-ties that the outside tracks are placed on, thus, of course, doing away with all street excavation, as this tube merely takes the place of a small section of the pavement. The cable rests on and is carried by two-wheel trucks 9 feet apart, which move on two small parallel tracks inside of the tube. At regular intervals between these trucks there are what may be termed huttons, 3 inches in diameter, which are rigidly placed on the cable. In connection with the trucks, and which revolves with them, is a small steel brush which constantly keeps the tube clear of any snow, water or other foreign substances which may enter the slot. This is conveyed to receptacles at regular distances along the line, generally near the intersections of streets, where communication is had with the sewer, and consequently the tube is always free. At the engine-house a large horizontal drum, provided with indentations in which the huttons enter at regular intervals, is connected with the power plant, and steadily, firmly and positively moves the cable at the required rate of speed. In case of any possible mishap, subjecting the cable to any extreme strain, the drum moves out of gear and the engine runs loose, the engineer shuts down, investigates and remedies the trouble. This is in marked contrast to the breaking and filling up of the immense conduits now used with the cable.

The cars used are ordinary horse cars, with an addition possibly costing \$50, consisting of what is termed a sprocket or forked wheel, which can easily be elevated to the bottom of the car by the driver stepping on a lever. The forked wheel when in place extends into the slotted tube, where it comes in contact with the huttons previously mentioned. This wheel revolves as the huttons pass when the car is standing still. The driver, by turning his brake-handle to the left, slowly causes this forked wheel to become rigid, which necessarily starts the car slowly and without any disagreeable jerk. The action of stopping is the reverse—the moment the driver turns the brake-handle to the right, releasing the forked wheel from its rigidity, any further movement applies the brake to the wheels and the car is quickly stopped. It may here be stated that the driver occupies the same position on either platform, and his movements in starting and stopping are precisely similar to those in present use. By a close estimate it is calculated that the cost of cleaning out manholes, the wear and tear of the present cable system, and the attention it has necessarily to have will amount in Chicago to some \$3000 per mile per year. This, of course, is in excess of the interest on the original investment. This \$3000 per mile annually, being the interest on \$50,000 at 6 per cent, would construct 5 miles of the street work of the Rasmussen system.

REFORM IN HEATING RAILROAD CARS.—The necessity of devising some safer and practical system of heating and lighting railroad cars than has heretofore been used has long occupied the attention of engineers. This inquiry has been greatly intensified by the late terrible casualties which have culminated in such fearful destruction of human life from fires kindled by stoves and lamps. It is encouraging to note the great activity and interest which has been recently developed in this direction. Steam heating, direct from the locomotive, is fraught with so many practical difficulties, that it can hardly be brought into general use. The latest, and the apparently most practical idea, is to provide a special steam-generating car, which can be at all times connected with the train, and regulated according to circumstances. Several different experiments are now in progress on various Eastern roads, out of which it is confidently expected some thoroughly practical and safe plan will be devised. A thorough reform in this direction is imperatively demanded, and if railway companies will not, of their own accord, soon introduce some other plan than coal stoves and kerosene lamps, the reform should be hastened by legislative action.

OSCILLATION OF CHIMNEYS.—The amplitude of the oscillation of chimneys has been exactly measured by observation of the shadows cast by the sun upon the ground. Recently the oscillations of a chimney 115 feet high and 4 feet in diameter, externally, at the top, near Marseilles, France, were observed by the shadow during a high wind to attain a maximum of 20 inches. It was estimated that the chimney, deflected by an initial impulse, would have made four or five oscillations before returning to a state of rest. On the contrary, by a succession of impulses isochronous with the oscillations, a chimney may finally be overthrown. Such is the explanation of the destruction of certain chimneys in which all the conditions of statistical stability were fulfilled.

TELEPHONING between New York and Philadelphia is now as easy as it was between points a block apart a few years ago.

USEFUL INFORMATION.

Insect Powder in Liquid Form.

A method of employing insect powder in form of alcoholic extract is the most advantageous for use in fields and garden.

The principal drawback connected with the use of insect powder is this, that its effect, when applied in substance, is only certain when it comes in actual contact with soft-bodied insects. In the case of hard-bodied or haired insects it often produces only stupefaction for a time. This drawback is to a great extent removed by employing the alcoholic liquid extract, which may be prepared by percolation, or, according to the author, by macerating one pound of insect powder for four or five days with two pints of alcohol in a warm place, then separating the alcohol and adding one pint of glycerine. This liquid extract is to be diluted with water before use. For hard-bodied insects it may be diluted with 20 parts, for more sensitive insects with 30 to 40 parts of water. If it is to be used out of doors, it is self-evident that it should not be applied while rain is threatening, nor during the hot part of the day. The best time is early in the morning while the dew is still on the ground, or during cloudy days.

If a decoction of insect powder is desired, this may be readily made by pouring boiling water upon it and macerating in a covered vessel until cold.

In many cases a single mixture of insect powder and water will be found quite effective. A good proportion is, according to the author, one-half ounce to two gallons. [This seems to be altogether too weak.]

The decoction, however, is much more effective. It must be used as soon after preparation as possible, and at a time when its effect will not be interfered with by the condition of the atmosphere.

It should be stated that the majority of insects do not die immediately after having come in contact with insect powder or one of its preparations. They are at first only stupefied, but death usually comes after a few hours, and in some cases not until after several days.—*Drug Reporter*.

CLAMP FOR STOPPING LEAKS IN PIPES.—A clamp has recently been patented which must be particularly valuable and convenient in dwellings wherever water-pipes are used, as well as for engineers and plumbers. The invention consists of a clamp which has an opening in one side of sufficient size to allow the clamp to be readily placed upon a pipe. In the interior of the clamp, at one side of the side opening, is formed a recess to receive and fit upon the side of the pipe. In the interior of the clamp, at the other side of the side opening, is formed a groove or recess to receive a key. In using the clamp it is placed upon the pipe with the recess upon the side of the pipe opposite the aperture to be closed. A pad of leather, copper, rubber or other suitable material, is placed upon the pipe over the aperture; a saddle, having its inner side concave to correspond with the curvature of the outside of the pipe, is placed upon the pad, and the key is driven into the groove along the outside of the saddle. The saddle and key are tapered in opposite directions, so that the saddle and pad will be forced down squarely upon the pipe by driving the key into the groove, which will securely close the aperture. This simple invention must be very convenient for use in emergency, if at no other time, while waiting for a plumber. It is applicable to steam as well as water-pipes. The inventor is Wm. W. Knight, of Jersey City, N. J.

A CURIOUS HEATING APPARATUS has been discovered and devised by Prof. Morse, of Salem, Mass. It is a most interesting and practical method of utilizing the sun's heat for "artificial warming." The device consists simply of a shallow box, the bottom of which is corrugated iron, and the top of glass. This is placed outside the building in such a position that the sun shines directly upon it, the heat rays of the sun pass through the glass and are absorbed by the iron, heating it to quite a high temperature, and, by a system of ventilation, a current of air is passed through the apparatus and into the room to be heated. By this means the air was heated on pleasant days to about 90 degrees by passing over the iron. Rays of the sun are also utilized for motive power by the illustrious Swedish-American engineer John Ericsson, who is now in his 84th year—and he is said to be working in his shop ten hours daily, the "sun motor" having been his chief object of study and experiments for the last 20 years.

DURABILITY OF ZINC.—In Dr. John Percy's book on Metallurgy, published by John Murray, of London, in 1861, page 531, it is said that at the ordinary temperature zinc is not acted upon by dry oxygen; but when exposed to moist oxygen or atmospheric air its surface acquires a compact, tenacious gray coating of hydrated oxide, which impedes the oxidation of the subjacent metal. In this respect the rust of zinc differs much from the rust of iron, which, instead of impeding, seems rather to accelerate the oxidation of the subjacent metal. By the conjoint action of moist oxygen and carbonic acid, zinc is converted into a hydrated carbonate. The roofing from which the specimen analyzed was obtained had been exposed to the

atmosphere of Munich for 27 years. Pettenkofer ascertained that during that period 3.831 grammes of zinc per square foot (Bavarian) had been oxidized, and that nearly half of the oxide is carried off by rain. Hence he estimated that a layer of zinc only 0.005 of a line (a line is one-twelfth of an inch) in thickness requires, in the atmosphere of Munich, 27 years to be entirely corroded; so that, leaving out of consideration the oxidation of the lower surface, which may be practically disregarded, a zinc roof of one-quarter of a line (equal to one-fortieth of an inch) in thickness would be completely corroded in 1243 years.

SHAFTS AND BELTS.—In the location of shafts that are to be connected with each other by belts, care should be taken to secure proper distances one from the other. A general rule may be stated, thus: Where any belts are to be run over small pulleys, 15 feet is a good average. If larger belts, working on larger pulleys, a distance of 20 to 25 feet does well. Shafts on which very large pulleys are to be placed for main or driven belts should be 25 to 30 feet apart. Nothing can be more expensive to a user of belts than a poor lacing. The best is the cheapest.

REMEDY FOR RATS.—A writer in the *Scientific American* says he cleared his premises of rats by making whitewash yellow with copperas, and covering the attics and rafters in the cellar with it. Into every crevice which a rat might go, he put the copperas and scattered it in the corners of the floor. The result was the complete disappearance of rats and mice. Since that time not a rat or a mouse has been seen near the house. Every spring the cellar is coated with the yellow wash as a purifier and as a rat exterminator, and no typhoid, dysentery nor fever attacks the family.

A PAPER CHIMNEY.—A large factory of Breslau, Germany, required a chimney 54 feet in height. Instead of constructing the chimney with bricks, as usual, a large number of solid blocks of paper firmly compressed were made use of. These blocks were placed carefully one on the top of the other and joined together with a special cement. The chimney is non-inflammable, is very elastic, and is by the nature of the material quite secure from lightning, which so often plays such havoc with the more ordinary sort of factory chimney.

ADVERTISE.—This word is traced back to the early part of the fifteenth century; but in those times it was used in the sense of advert as well as in that of inform. In the seventeenth and eighteenth centuries it was uniformly pronounced with the accent on the middle syllable, advertise; subsequently, advertise became universal; the present tendency, says Dr. Murray (in commercial usage, at least) is to say advertise, apparently after the verb in use.

ERASING LINES.—Sometimes the draftsman wishes to erase a line without removing other parts of the work or damaging a line which cuts the line to be removed. In the above case, lay a sheet of paper upon the line it is desired to save, and with an India rubber eraser the desired line can be removed, and you can work clean and sharp to within one one-thousandth of an inch of the parts desired to be left.

GOOD HEALTH.

The Cancer Discussion.

The cancer discussion, which has been originated in these columns, seems to be creating quite an interest, not only in this city, but in various distant parts of the State as well.

We would take this occasion to make one more serious appeal to the medical profession at large to inquire into this matter. Some of them are already doing so. To all who so desire, every reasonable opportunity will be given to meet with persons who have been cured by our specialist after passing through the hands of the regular faculty, and, in many cases, after submitting to one or more operations. Inquirers will also be afforded the opportunity to visit patients now under treatment, and, if they see proper, to place special cases of their own under treatment, with the fullest privilege of watching and noting results. With very few exceptions, the only thing we have thus far heard from gentlemen of the profession has been "You are only advertising the woman." This, we need hardly state, is very remote from our object, which is simply "to court investigation."

We had hoped, as already stated, to have kept the investigation within the body of the medical profession, and thus have avoided all newspaper discussion, but the action of the Medical Society of this city in most positively declining to investigate certain cures of cancer, or so-called cancer, has left us no alternative but the one we are now pursuing until the public, if not the faculty, are fully satisfied by the accumulation of evidence that cancer can be cured, or the reverse. Inasmuch as the public has from time to time loved to demand a cure, be it possible or impossible, for every disease, thus assuming that doctors of medicine should be infallible, and for reasons of a personal nature already expressed, the writer feels it a duty to make this appeal in the interest of humanity and for the welfare of the public, and more especially of those suffering ones so often said to be "hopelessly diseased." Protecting

such from ignorance or lack of skill, whether it proceeds from quackery or any other source, as well as seeking every other method for their relief, is the palpable and only rational course open to this true professional man or woman.

From letters received the past week in regard to this matter, we give the following one entire, as it appears to have been called out by what has heretofore been said in these columns, and is entirely unsolicited. We regard the cure as a very important one, and as the case is one of long standing it affords good evidence of the fact that the cures are genuine and do not return, as is the case with 19 out of 20 who submit to the knife. The letter is dated Chico, Butte Co., March 15th, and is addressed to the editor of this paper.

DEAR SIR:—I take this opportunity of writing to you about a sickness I had six years ago. I had been troubled with female disease for several years, and was treated by several of the leading M.D.'s of the State, and among the number Dr. John Scott, of San Francisco. When, six years ago, a hard bunch formed on the uterus, I employed Dr. Max Werder, of 36 Geary street, San Francisco, who treated it for six months. I continued to get worse all the time. I then went to see Dr. Blake for advice. He told me it was cancer and advised an operation immediately, as he said I had no time to spare. I then saw Dr. Werder again. He then told me he believed it to be cancer, but did not advise an operation; said it would be far better for me to let nature take its course; if I did, my sufferings would be far less. He told me that he would like me to go and see Dr. Fraser, of Kearny street. I did so. He told me the only thing that could be done was to remove the entire organ. Of course I did not feel inclined to have that done, and came to the conclusion that if I must die I would die a natural death.

Just at that time my landlady came to me, saying she had learned of —, who made cures a specialty, and advised me to try and find her. Early next morning, I called again on Dr. Werder. I told him what I had heard in regard to —. He had also heard of her, and advised me to go and see her; said, "It is your only chance." I did so. She told me she could cure me if I had had no operation performed. I said no, and placed myself in her care on the 18th of July, 1881. On or about December, she pronounced me cured, and I have remained well of the disease ever since. When the cancer was nearly sloughed off, she sent for Dr. Werder, who came, and I heard him say, "Dr. —, when you cure that woman I will believe it, and not before." She said to him, "I am going to cure her."

When I was cured I went to see him. He told me that — had done a good job for me, and there was not another doctor in San Francisco that could do for me what she had done. All of the above facts are true. Yours respectfully, MRS. M. A. MCCARTHY.

THE SNEEZING SPOT ON OUR HEADS.—As a *Journal* representative sat in the chair of a Maiden-lane barber the other day, the genial artist of the brush observed that the journalist sneezed when his hair was combed. "Did I touch the sneezing spot?" inquired the barber. He then proceeded to explain that the "sneezing spot" was a sensitive place to the left of the middle of the forehead. "Why," said he, "there are men who come in here who sneeze regularly every time I comb their hair or shave them just as soon as the comb passes over that spot. I had a man in here yesterday who sneezed three times just as hard as he could, all because I touched the 'sneezing spot.' It must be a very small nerve that tickles the nostril."—*Albany Journal*.

[Just so, my friend; that is an example of sympathetic action between nerves; that comb irritated the brow-causing nerve, and made the nerve of smell to produce a sneeze. This the smelling nerve did by reflex action. It is a good example of sympathetic and reflex action of nerves.—Eds. Press.]

HOW TO PREVENT THE SPREAD OF SMALL-POX.—Although there is no contagion more powerful or certain, experience has taught that the spread of smallpox may be absolutely prevented by a strict observance of rules prepared for the protection of infected districts. On the first report of the existence of a case, systematic vaccination or revaccination of every person exposed should be at once resorted to. Whenever it is known that any person is sick with smallpox or varioloid, isolation of the individual should be promptly and rigidly enforced. Any accumulation of filth or refuse of any kind about our premises should be at once removed, and disinfectants freely used. A strong solution of copperas (sulphate of iron), alum—in the proportion of two or three pounds to a gallon of water, or combined with carbolic acid made by mixing eight pounds of dry copperas and a pint of carbolic acid in five gallons of water, and stirring the mixture briskly until dissolved, is good to disinfect all kinds of drains and foul places in houses, stables and yards.—*Ventura Free Press*.

TO DESTROY SENSITIVENESS.—According to Dr. Brown Sequard, one has only to harden the neck and feet and destroy their sensitiveness to prevent taking cold. This is done by daily blowing a stream of cool air, by means of an elastic bag, upon the neck, and by immersing the feet in cool water. The air is at first only slightly cool, but is each day made colder, until the neck can stand an arctic blast with impunity. The feet are immersed in water which is at first at a temperature of about 90 degrees Fahrenheit, and this is gradually reduced to 30 degrees Fahrenheit.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

RICH STRIKE.—*Ledger*, March 19: As G. B. Ratto, of Irishtown, this side of Clinton, was plowing in his ranch last week, he turned up some quartz rock which on breaking was found to be plentifully sprinkled with free gold. Further research resulted in the discovery of a vein of the same kind about three feet wide. He has extracted some two tons of ore, and all of it is said to contain free gold visible to the naked eye. He has sunk on it ten feet, and it maintains its size and richness all the way down. Indeed, it is said that there is not a piece of rock in the whole pile taken out that does not show free gold. Samples may be seen at Ginoebio's store. Such rock is estimated to yield all the way from \$100 to \$500 per ton. The discovery is close to the claim now being operated by the McKenzie brothers. It promises to be a valuable find. The big tunnel at Middle Bar was closed on Monday last. All the miners were discharged, and the mouth of the tunnel closed. It is reported that the suspension is of a temporary nature. Rumors are afloat that W. A. Nevills is likely to be back before the first of April. It is also rumored that Captain Nichols is likely to return here, and take a hand in the management of the property, but whether these reports have any foundation we are not prepared to say. The most feasible explanation of the sudden cessation of work is that it is done to enable necessary repairs to be done to the drilling machinery, and that as soon as these repairs are completed, work will be resumed. Men are at work doing this repairing. The Amador gold mine has let a contract to sink the shaft 100 feet deeper. The price agreed upon is, we are told, \$17.98 per foot. This will carry the shaft 220 feet deep.

SUTTER CREEK.—Water was turned on at the Wildman yesterday to test the machinery, and everything was found to work like a charm, and gave entire satisfaction. The rope was put on today. The pump, which they have had to wait a few days for owing to the press of work at Knight's foundry, was delivered at the mine to-day, and mechanics are at work putting it into the shaft.

Butte.

MILLS.—*Oroville Register*, March 17: The time is fast approaching when Butte will be crushing vast amounts of profitable working quartz rock. At Oregon City one of the most perfect ten-stamp mills in the State has lately been erected on the Nesbit ledge. Of this Chas. Deiter is the efficient superintendent. The quartz is paying well; the mill is run on the most economical manner; the latest and most approved apparatus for saving gold has been introduced, and the ledge is thoroughly prospected so that we may expect this mill to do much toward showing outside capitalists that quartz mining in Butte is a paying business. Two quartz mills of ten stamps each are now pounding out the rich quartz of the Defiance ledge at Oregon City. McGrath & Matherson are proprietors of the mills, and everything wears a promising look about the premises.

Calaveras.

AROUND ANGELS.—*County Record*, March 15: The mines and mills in and around Angels are booming. Visiting the Nevell mine yesterday, we learn that stoping is being done in the 200 and 400 foot levels on the north end, the force of men having been taken from the south stope and placed elsewhere. The mill is running steadily on some of the richest looking ore we have seen from the mines for some months. The plates are looking well and we are informed the cleanup for last month exceeded those of the previous runs. At the Lane, things look lively. Stoping both north and south, on the 150 foot level. At the hoisting works everybody seems to be kept busy; the engine is on the go almost constantly, hoisting from 125 to 150 tubs of ore, and from 25 to 30 tanks of water each shift. The mill has lost but little time in the past two months. The plates are looking nicely, showing amalgam in quantities to suit the proprietors. The work of filling in the old works goes steadily on, there being a small force of men constantly laboring for the desired result. The Tozier is running steadily, both mill and mine; no cleanup has been made as yet, the mill having been running but about a couple of weeks. The Matson mill started up again last Thursday, and has been running steadily since the repairs were made. It is the intention of the owners to make a 35 days' run before they have a cleanup. The mill at the Waterman mine is kept running both day and night, and the plates are showing up as well as could be desired. Everything is in excellent working order and acts like a charm. Mr. W. W. Waterman, the proprietor, says that he can crush about 12 tons of ore in 24 hours. McCreight and Hardy are still drifting along the vein in their mine at Albany flat. They have not as yet worked through the chute. Rock from the Glass mine is being crushed at the Osborn mill, at Smith's flat. We are informed that the ore is very rich in free gold and sulphurets. More will be said about this mine in the future. Caster, Smith & Son are still pegging away on the North Star mine, at Bald bill. We understand that work has commenced on the new hoisting works at the Gillis mine, at Tuttle-town. New hoisting works are being erected on the Lillie mine at Kelley's gulch, owned by Lillie, Morehead & Co., of this town, the machinery having arrived.

GRAVEL.—*Calaveras Prospect*, March 19: Ed. Rigney is prospecting a gravel claim at Jimmy Hill's ranch on the Mok bill road. He has men employed clearing the ground of brush where he expects to work. A heavy casting in the gearing of the pump at the Sheep Ranch mine gave way on Monday last. A new one was telephoned for and work had to be suspended until the pump could be repaired. Several mines will soon be opened on Central hill, and the miners in that vicinity anticipate a boom in mining in that section this spring.

SHEEP RANCH MINES.—*San Andreas Citizen*, March 19: W. A. Henry brought to town again, last Sunday, specimens of ore from a mine in San Domingo region, owned by himself, Jas. Molloy, and Patsy Gallagher. The rock showed fine gold in profusion, and Mr. Henry claims there is an

abundance of it. It is about \$50 milling ore, so it is calculated. The pinion wheel of the pumps at the Sheep Ranch mine was broken on Sunday last. This will again suspend operations in the lower levels until a duplicate of the machinery can be obtained from San Francisco. This may take several weeks. The Hard Scrabble Co. is scrabbling as hard as ever to find the object of their investigations. They are making a good and thorough search. Quijoatao, Old Tom Smith, Smiley, Poor-man's Treasure, and other mines, that have yielded prospects, are at present inactive. Cause, presumably, a lack of capital to continue operations. The Woods mine at Indian creek will be started up as soon as the necessary machinery can be obtained for proper working. The creeks in this vicinity have been running lower than at any time to date for years. The outlook for the summer's supply of water is not yet encouraging. All mining operations are at present suspended in the Bonita gulch district. More prospecting will be done, however, during the approaching summer months.

El Dorado.

COLOMA TOWNSHIP.—*Placerville Observer*, March 19: The mining interests of Coloma township are now of little importance as compared to former times; placer and river mining having nearly ceased, except by the Chinese. During the rainy season, however, there are as yet a few white men engaged in placer mining, but most of the miners are prospecting for "pockets," of which some are occasionally found that pay well. There are a number of quartz lodes located, but few of them are worked. At the Hill lead mine, near Granite Hill, some work is now being done. McKenney & Wood, near Uniontown, are at work with an arastra on the old Stuckslager mine, and are meeting with fair success. H. Toehner, near Webber creek, is at work on his ledge, as is also John Gallagher, Kipp & Murphy. At Michigan Flat, a prospecting tunnel is being run into the hill, but so far we believe without success. The other claims are lying idle.

HENRY'S DIGGINGS.—*Mountain Democrat*, March 19: Miners are all getting ready to commence work in earnest. Armstrong and Roberts have commenced work in their tunnel, and will soon be taking out gravel again. Jeffreys has commenced work in the Cousin Jack mine.

GRANITE HILL.—Forni and Kune are engaged in erecting an arastra on their mine on Mt. Thompson, which promises to be a valuable property. They have sunk on the ledge to the depth of 30 feet. A. F. Anable and Alf Rogers have been prospecting a number of quartz seams, occasionally finding a pocket. Will Veerkamp and Line Gale have cleaned up a two-weeks' run on their surface mine, with handsome receipts.

Nevada.

RICH ORE IN THE NEVADA COUNTY MINE.—*Grass Valley Union*, March 15: A new pay chute has been opened upon in the Nevada County mine, at Nevada City, which promises to lead to a rich and important development. The find was made on Friday morning in the south drift on the 220 level, a few feet from the shaft, where in stripping the vein a ledge 12 inches in thickness was found on the footwall, which was highly sulphureted and rich in free gold. Several carloads of quartz were taken out during the day, in which there was a considerable quantity of rich specimen ore—nothing richer having been found in the district in years. The news of the strike created quite an excitement, and during the day several hundred people visited the mine to take a look at the specimens that were brought to the surface. The strike is considered important, as it is believed the drift will open up an extensive body of rich ore. In the north drift of the same level a different pay chute is being at present worked, the ore from which gives an average yield of \$40 per ton. The Nevada County is situated a few rods above the suspension bridge over Deer creek, the works being situated on the banks of the creek. Prospecting operations have been carried on for several years, and about \$20,000 have been expended on the plant and on underground work. The stock of the company is held principally by residents of Nevada City.

NORTH STAR.—Everything was running smoothly at North Star mine yesterday, with the water-power. The mill will run its full head of 30 stamps this week.

PITTSBURG.—The pumps of the Pittsburg mine are kept constantly going, the water being lowered at the rate of eight feet per diem. It will take about four weeks longer to pump the mine dry. The Pittsburg was compelled to shut down at the time of the snow blockade, and a large quantity of water accumulated in the mine.

THE DERBEC DRIFT MINE.—*Nevada Transcript*, March 15: For about six weeks past operations at the Derbec mine have been suspended as far as washing was concerned by the snowstorm blocking the ditches and cutting off the water supply. The employees have mostly stayed around there waiting for a resumption of operations. Quite a force of them are now engaged in cleaning out the ditch, and it is hoped the water will again be running by the end of this week.

NORTH STAR MILL.—*Grass Valley Union*, March 19: The new North Star mill is now ready to commence crushing ore, but it will probably be some time before it will be regularly at work, as the machinery being all new it is desirable to have everything running smoothly before the stamps are set agoing for uninterrupted service. The water-power has been on several times, and the machinery worked all right, but the pressure of the water has shown some defective places in the pipe-line which require strengthening. These, however, are but temporary drawbacks, easily remedied, and cannot cause long delay. A new pipe-line generally makes some leakage, and delay from that cause is looked for. The mill is a splendid one in all its appointments, having every valuable improvement known to gold-saving mills, arranged with particular reference to convenience and the cheap working of ores, and very strong and durable in its construction.

NUGGETS AND GOOD GRAVEL.—*Nevada Transcript*, March 19: H. B. Nichols has been doing some little work of late on his placer claim. During the winter his incline shaft caved and buried a pump. Mr. Nichols is cleaning out the shaft, and when this is accomplished he intends to sink on the lead. The dirt removed from the shaft is being washed, proving remunerative, and last Monday a four-ounce nugget of solid gold was found. One

weighing half an ounce also came to light. Much gold was taken out from this claim last year—over \$6,000 in fact. A still larger bonanza will probably be unearthed when the lead is more fully developed.

Plumas.

GOOD PROSPECT.—*Plumas National*, March 19: Messrs. Courtright & McDonald have struck a deep channel on the middle fork of Mill creek, near Quincy, that promises to be a valuable find. They have run a tunnel 150 feet, and sunk a shaft seven feet without finding bedrock. The gravel pays \$2 to the carload, and gets better as they sink down. The channel can be traced quite a distance, and is evidently an old river bed.

Sierra.

RESUMED.—*Mountain Messenger*, March 19: The Extension men at Forest City, after over a month's enforced idleness, have resumed work, there being abundance of water to run the blower. We are told that 16 ounces to 11 picks were taken out this week. The Buzan tunnel up the ridge, being run by the Bassler brothers, contractors for the company, is in 625 feet. Dennis Finane is pushing work rapidly in the South Fork. The North Fork lessees are gladdened by the rise in Oregon creek. In both these mines they expect to strike "solid ground" before long. Tyler Dudley is preparing to open up diggings down the creek, a short distance from town. The Ruby is reported as bolder up very well, a full force being at work during the whole storm. Mr. Morrow has returned to the Pilgrim mine, and active preparations indicate that work is soon to commence there again.

SIERRA QUARTZ LEDGES.—*Cor. Messenger*, March 19: Not in the history of Sierra county has there ever been so much prospecting for quartz as there has in the past year. The prospects for 1887 are brighter than ever, and a good outlook is expected from the famous mining district near Sierra City. Your correspondent had this summer an opportunity to visit these mines. The following are a few of the principal quartz lodes in that district: Wm. Casserly will crush rock from his ledge, in Van Slyke's mill, near Butcher Ranch, in the spring. The Cleveland mine is looking better as the main tunnel progresses. The mine is paying dividends every month. About 60 men are employed. Whitney & Co. are still at work in their mine near China Flat. The ledge is six feet wide and prospects \$15 per ton. A 10-stamp mill will be erected in the spring. The ledge owned by Schlesinger, Littlejohn & Mooney is looking favorable. The owners are deserving success in their enterprise. Wm. Swan & Co. are still pushing their main tunnel ahead. Two men are employed at present. The mine has a favorable outlook. Eli Wolford and others have a fine vein of ore in their lower tunnel, which is in a distance of 100 feet. A 10-stamp mill will be erected in the spring. P. Haven is going to open the Gold Lake quartz mine this summer. The Phoenix, Colombo, Marguerite and Keystone mines, which are at present idle, will resume operations by next summer.

Siskiyou.

PICK AND PAN.—*Yreka Union*, March 19: Pyle & McCook on Deadwood are crushing good rock from their mine. The A B C claim on Fox creek, owned by Andrews, Boye & Coggins, of South Fork, starts up this week. Hegler brothers have a splendid ledge on Humburg, and it is improving as work progresses. They refused an offer of \$7000 for the property last week. William McConnell has leased his Klamath river claim to a company of Chinamen who will work it this season. We hear that they have already taken possession. Hon. R. H. Campbell's hydraulic claim, in Quartz valley, started up Monday of last week with a full crew and an abundance of water. This claim has proved to be one of the best paying in the county, and it is believed that it will beat its record this season. Eastlick brothers at Oro Fino, commenced work in their claim last week, under favorable auspices, and expect to realize better pay than last season, when the mine astonished everybody. This claim is operated with a new kind of elevator, their own invention, and it works like a charm; is made of wood; is very simple. Wright & Fletcher commenced operations in their splendid paying Oro Fino mine last week, and they are jubilant over the prospect of a long and profitable season. Most of this week will be consumed in opening the mine, the alternate freezing and thawing spells this winter having caused the banks to cave at the spot where they left off last season. R. D. Stone informs us that the Fort Jones claim, Klamath river, will not be opened before the first of next month. Their head-dam withstood the recent high waters and a portion of their wing-dam remains. This is one of the largest river claims in the county and it will be worked on an extensive scale this season. Last year the company paid out for wages and supplies over \$10,000. The most valuable piece of mining property in the county is unquestionably the Steamboat mine, situated on McAdams creek. Through bad management, defective pumping and hoisting machinery was erected at an enormous expense which financially ruined some members of the company. Even then, those who were able would have successfully carried the enterprise through, had not dissatisfaction and dissension arose among the owners, and thus the most valuable mine in the county was shut down over three years ago. For the prosperity of our county we sincerely hope that the owners of this important mine will come to an agreement, or that the property will change hands. A million dollars has been taken from the creek bed just above this mine. The claim itself paid big when it was worked, but the frequent breaking of machinery permitted only short runs. It paid an ounce to the man every day that work was not interrupted. The new mining district on Knownothing creek, a tributary of the South Fork of Salmon, is beyond a doubt a rich field, and it is just beginning to attract outside attention. The ledges thus far discovered have proved rich and extensive. Two years ago Fred Radelfinger, of San Francisco, struck camp on the creek with the intention of prospecting. He had been over the same ground in 1872, while on a hunt, and picked up a piece of float which was rich with gold. After months of bunting he struck a ledge and later found three more. He was associated with B. Funk, a half-brother of Senator Hearst. They prospected the ledges thoroughly, and on finding that they would pay big, at once erected an arastra and commenced operations in earnest. Crushing enough to buy a five-stamp mill, Radelfinger went

below to purchase one and has just returned. I will be shipped over the mountain as soon as pack trains begin to run. One of their ledges, between slate and granite, is seven feet. It will require a concentrator to successfully work the ore from this mine. An assay from unselected rock gives \$140 in gold and about \$25 in silver to the ton. The other ledges owned by these gentlemen are not as large or so rich. Their principal vein of free-milling ore pays from \$80 to \$90 per ton. As soon as their mill is put up a large force of men will be worked. Their arastra is about eight miles up Knownothing creek from the mouth. Hansen & Co., and H. A. Clark, also have splendid paying properties in the same vicinity, and are running arastras.

Shasta.

BULLION.—*Redding Free Press*, March 19: As the result of three weeks' run, Conant took from the plates of the Uncle Sam mill something over \$2000. The battery was not cleaned up. Andy Fife has made a success of piping water across Spring creek to run his mill by water-power. He has not made a cleanup recently, but when he does, the indications are that he will have something good. Bassett, Stocks & Co. are still pushing tunnels on the Cressus mine on Squaw creek, and have a large body of ore on the dump. This ore is of low grade, but they expect soon to strike something worth mentioning. The Lower Springs Milling and Mining Co., of Salt creek, has been reorganized, and H. Lorentz and O. M. Loveridge, of Weaverville, Trinity county, are now members of the firm. Operations are now to be prosecuted vigorously. Prof. Connor and W. E. Fricke have a fine quartz prospect above Middle creek, and not far from the Paul mill. They have a tunnel in 57 feet, and expect to soon strike the main ledge. Several stringers of quartz encountered show very rich rock. The Redding Reduction Works have been running night and day upon ore from various mines. One lot from Litten & Bennett's mine, Igo, yielded splendid results. Ore has also been worked from Butterfield & Griffith's ledge on Olney creek; 50 tons from the Texas and Georgia, Old Diggings; ore from Scroggins' mine, Round mountain; and ore furnished by Jos. Gage, from Salt creek. The process seems to be the correct one for all kinds of ore, and the cheapness of working is really remarkable.

San Bernardino.

CALICO NOTES.—*Print*, March 19: H. Argall and Marcus Pluth have made a very rich strike in the Juanita mine adjoining the Oriental. They have sunk about 15 feet on a well-defined vein that fairly bristles with horn silver. They are much elated over their rich discovery and the indications are that the ore will hold out to some depth in its present quality. The ore averages 150 ounces to the ton. The location of the mine is most favorable, it being in the neighborhood of the Occidental, Garfield, Little V, Pinto, Comet, and other mines that have been worked with profit some time in the past, and are now sources of considerable wealth to the owners and lessees. A tunnel is being driven into the Waterloo mine in West Calico, starting on an adjoining claim owned by Dan Edwards. It is now in about 460 feet, and will intersect a shaft that is being sunk at a depth of about 230 feet. Chas. McKennon, Jesse Riley, and others, have the contract for running the tunnel. Ore is found in the Waterloo in all the openings and in immense quantities. Thirty men are at work sinking and drifting, and it is expected that about 50 more men will be employed in order to keep 30 or 40 stamps of the new mill in constant operation. The Harmonia mine adjoining the Waterloo, owned by H. B. Stevens, is showing up some fine ore at a depth of 100 feet. It is being worked by Greer & Blair, who have sunk a shaft to a depth of 100 feet, and have drifted 40 feet toward the ledge, which is a continuation of the Waterloo ledge. The ore is found in porphyry contact. The property has every indication of developing into a valuable and permanent mine. The Iron-clad claim, a few rods west of Calico, has been sold to the Barber Mill and Mining Co., by H. B. Stevens and Soule & Stacy. This claim will no doubt prove a valuable low-grade mine to the company, and is in addition to and in close proximity to their present promising group of seven or eight claims. The Comet and Pinto mines in East Calico have been a source of profit to the chloriders working on the same, several having cleared a few thousand dollars apiece during the past six or eight months. The claims are still looking well. The Barber Mining Co. is running a tunnel in the Silver Reef mine, and uncovering considerable ore of a fair grade.

Placer.

QUARTZ.—*Placer Herald*, March 19: The other day we saw a magnificent chunk of quartz belonging to Mr. Shurtleff, of Ophir, who took it out of the St. Patrick mine. The rock has a creamy appearance, and is filled with free gold. Mr. Shurtleff estimates the specimen to be worth about \$600. This mine, under the management of Messrs. Shurtleff & Robinson, has made a splendid record. Some sulphurets which they had sent to Reno to be reduced, yielded \$466 in gold and 50 ounces of silver to the ton.

Tuolumne.

WATER SUPPLY.—*Tuolumne Independent*, March 19: The water in the Tuolumne Company's ditch is now running in full supply, and will probably continue, barring accidents, until fall. The ensuing mining season promises to be more than usually active, both in gravel and quartz. As mining is essentially the backbone of this county, and must be our main source of prosperity until a railroad comes to develop other industries, the water supply is a question of vital importance. Without the Tuolumne ditch, this part of the county, at least, would soon show lamentable signs of stagnation and decay. Messrs. Wm. G. Long and Jos. Hampton have bonded the old Cardnell claim, at Tuttle-town, of Mr. D'Arbours, the owner, and will soon proceed to open the old works and develop the mine. The old shaft is down about 40 feet, and partly filled with water and debris; but these old and experienced miners will soon put the mine on paying ground. It is said that over \$300,000 has been taken out of this pocket mine, and it is believed that there is lots more deeper on the "shoot."

QUARTZ.—*Tuolumne Independent*, March 19: We propose to further boom our quartz mines in and around Sonora, Columbia, and all along the great pocket belt of Tuolumne. This is something tangible, as our mines have stood the test in years past of many a boom. Old Bonanza Hill is holding

good its record, and Bald Mountain is yielding up its golden treasure to the hardy miner at an enormous rate. There will be a renewed activity in quartz mining in the county the coming season. New mills are going up in various parts, which gives a healthy outlook to this branch of mining industry. There remains an extensive field open to the prospector, miles of unbroken and unclaimed ground, with, we may add, hundreds of undiscovered milling and pocket veins. The development of quartz mines in the county can be said to hardly have commenced. We say there are extensive tracts of unclaimed ground in the mining districts; and yet we wish to call attention to another important fact relative to agricultural patents covering lands where it is reasonable to suppose there exist rich veins of quartz and gold-bearing gravel, that such lands should be made available to the prospector, by mutual consent of the owners, upon reasonable and considerate terms, which practice would, of course, set aside all recourse to law, and both farmer and miner profit by the custom when once fully established and recognized by all interested.

NEVADA.

Washoe District.

SAVAGE.—Virginia *Enterprise*, March 20: On the 1200 level the drift from the Norcross side is still being pushed into the Savage ground. The drift is in a large body of quartz that shows some good ore. No. 2 west crosscut from this drift is in a distance of 13 feet, all the way in solid quartz with spots of good ore. The whole body of quartz carries some pay. They are now engaged in opening the ninth station level from the Curtis shaft, and thence will run south to meet the drift on the 1200 level which is coming north, as mentioned above, from the Norcross side. On the 800 level the south drift from No. 3 west crosscut continues in a fine body of quartz which gives low assays. Are now hoisting ore through the Curtis shaft, where it is being deposited in the ore-house. Since last report there have been stopped from the 500 and 600 levels 660 tons of ore, and 765 tons have been shipped to the Mexican mill, Carson river. Bullion shipped since last report, \$16,758.25.

HALE AND NORCROSS.—On the 1300 level the south drift is now into the Chollar ground a distance of 400 feet. On the 1200 level the south drift has been advanced 35 feet. No. 1 west crosscut on this level was extended 10 feet, and No. 2, 15 feet. On the 5th station level the west drift was continued 25 feet, and its face is now 20 feet distant from the shaft. The ground in the drifts to the southward on both 1200 and 1300 levels still presses on the timbers, causing extra work in chipping and replacing the drift timbers. A great amount of virgin ground has been stripped on all the levels from the 700 down to the 1300, which will soon be explored. This is all new ground of great possibilities. The management are rushing the big double drift on the 1300 level into Chollar ground at the rate of 60 feet a week. This drift will strike the old Chollar incline and will be productive of a fine circulation of air.

CON. CALIFORNIA AND VIRGINIA.—On the 1435 level have continued stoping out ore from the bottom of winze No. 2, 165 feet south from the south line of the Ophir mine. The ore shows no change. On the 1500 level the south drift was extended 16 feet; total length, 527 feet. The usual amount of ore has been hoisted and shipped, and the average assays will be about the same as last week, namely, \$35.

OPHIR.—On the 1065 level east crosscut No. 1 was advanced 34 feet; total length, 182 feet. From the end of the south drift west, crosscut No. 1 was advanced 35 feet; total length, 173 feet. On the 1300 level the northeast drift running into Ophir ground from the Consolidated California and Virginia mine from the Ophir south line was advanced 30 feet; total length, 165 feet. The drift running north from the Consolidated California and Virginia mine was extended 20 feet; total length from the south line, 86 feet. This drift has passed through streaks of ore which gave assays of our average value. The face is still showing ore streaks that assay about the same as last week.

ALTA.—Are running a drift west from the 825 level to connect with the winze down from the 725 level. The drift is out 150 feet, and it has yet about 350 feet to go to make the connection. The rock in the face is very hard. The raise in the Keystone on the line of the Alta and Beaton is up 16 feet above the 725 level. On the 725 level are running a drift north into Lady Washington ground. Are now in 460 feet, with the face of the drift in vein matter of a promising appearance. When this drift shall have been extended 40 feet further, crosscuts will be made both east and west.

GOULD AND CURRY.—On the 425 level the south-east drift from the main south drift was advanced 24 feet; total length, 126 feet. It is still showing low-grade quartz. On the 300 level from the up-raise the west crosscut was advanced 26 feet; total length, 98 feet. The face is in the old stopes exposing ore in small quantities. Repairs to the main shaft are still in progress between the 1100 and 1200 levels. The east crosscut, opposite the west crosscut on the 425 level, is in porphyry showing streaks of quartz of a promising appearance.

CHOLLAR.—The old Chollar shaft is now about entering the old incline 1000 feet below the surface. Air was coming through into the shaft from the incline yesterday for the first time. By this time the shaft has doubtless broken through into the incline. There will be strong upcast draft in the shaft. As regards what is being done in this mine from the Norcross side, see the report on that mine. Work has been resumed on the croppings at the Sharon shaft, where much good ore may yet be obtained.

CROWN POINT AND BELCHER.—No work is being done in the ore-producing sections of either of these mines. They will be started up with full crews of miners as soon as Superintendent Jones arrives from the Bay. He is daily expected. Repairs to the main shaft are still continued, and it is being put in first-class condition. This has long been a needed work, as the shaft had become pretty badly dilapidated by the much and rapid hoisting it has for many months sustained.

ANDES.—On the 200 level are still taking out some very fair ore. As yet are occurs in bunches. Some of the bunches are very rich, while others are

of low grade. The average, or mixture, is fair milling ore. This ore is being stowed away in the mine. It will be milled as soon as facilities can be found. On the 300 level are exploring in the direction in which the ore bunches are found on the level above.

OCCIDENTAL.—The usual progress has been made in the drifts and crosscuts in the upper tunnel level. West crosscut No. 2, on this level, shows ore giving low assays. Low-grade ore is being extracted from small streaks of quartz on the 100 level from the south drift from the north incline. There is nothing new in the workings on the lower level tunnel.

HAYWOOD.—This mine is now keeping the Thompson mill, Devil's Gate, steadily at work. The ore breasts are all looking well. The ore in the winze below the tunnel is constantly improving. In the past five months—during much of which time no ore was extracted for shipment owing to deep snow and bad roads—has been shipped over \$90,000 in bullion to San Francisco.

IOWA.—Tunnel A face is in soft vein material. South drift from the same tunnel is in a strong ledge of quartz. Air shaft sinking from surface to connect with A tunnel is following down ledge on its westerly dip in good-paying gold ore. North and south drifts from tunnel B are yielding, in driving, considerable fine gold ore.

BEST AND BELCHER.—On the 1500 level the northeast drift was advanced 10 feet; total length, 751 feet. Near the face of this drift an east crosscut No. 1 was advanced 38 feet. At a point in the northeast drift, 105 feet south from No. 1, crosscut No. 2 was advanced 12 feet, and the face is in vein material of the usual character of that found in the mine at this depth.

YELLOW JACKET.—All is going on well and smoothly. The daily shipments to the Brunswick mill, Carson river, average 150 tons, which is all the mill can work.

POTOMAC.—Good headway is making in the drift south from the Chollar line, on the 250 level. It is passing through a mixture of quartz, clay and porphyry. Crosscutting will presently be commenced. Large quantities of ore are stowed away in the openings of the mine, awaiting milling facilities.

SCORPION.—On the 300 level the east drift has been advanced 35 feet, and its face is now 120 feet distant from the shaft. The ground through which this drift is now passing is softer than heretofore and is working to better advantage.

JUSTICE.—Work is progressing as usual on the 250 level, and a considerable amount of paying ore is being obtained from the south drift, now being run from the bottom of the winze, at a depth of 370 feet.

SIERRA NEVADA.—On the 520 level south lateral drift No. 2 was extended 42 feet; total length, 459 feet. From near the end of this drift west crosscut No. 7 was started last week and is being advanced in vein material of a favorable character.

MEXICAN AND UNION CONSOLIDATED.—On the 1300 level the joint Union and Mexican northeast drift was extended 29 feet; total length, 596 feet. This drift is now 351 feet in Mexican ground. The joint Mexican and Ophir east crosscut was extended 30 feet; total length, 275 feet.

UTAH.—On the 472 level the north drift from the main west drift was extended 44 feet; total length, 318 feet. The face is still passing through vein porphyry and quartz, the appearance of which has not changed since last report.

SILVER STAR.—The drifts north and south on the 100 level are in vein matter yielding fair prospects in free gold.

OVERMAN.—The usual shipments of ore are being made to the Vivan mill.

Cortez District.

FAVORABLY IMPRESSED.—*Silver State*, March 16: Professor Thomas Price, of San Francisco, who had been examining the Wenban mines, at Cortez, passed west yesterday. He is favorably impressed with the appearance of the mines and thinks they will be sold if the price is not too high. Professor Price is considered one of the best mining experts on the coast.

I X L District.

RICH ORE.—*Silver State*, March 15: George Lovelock, Jr., left for Salt Lake City yesterday with 21,000 pounds of ore from his mine in I X L district. The ore averages \$350 to the ton, and he says there is plenty of it in the mine.

Gold Run District.

HAULING ORE FOR SHIPMENT.—*Silver State*: Judge Bounfield says teams are engaged in hauling ore from the Great Republic mine, in Gold Run district, to Golconda, and two men are at work at the mine sacking the ore, a carload of which will be shipped to Reno at an early day. The roads are bad and there is considerable snow at the mine, which interferes with operations.

Rebel Creek District.

RICH PROSPECTS.—*Silver State*, March 19: The heavy snowstorms of February somewhat retarded mining operations in this district during their continuance, and afforded a rest to many of the old timers here, who have been, so to speak, unemployed at work for a long time to bring the camp to the front. Proofs of the richness of the camp are manifest to the most casual observer. Large ledges containing rich ores may be found from one end of the district to the other. Owners of claims are sanguine of a near and prosperous future. With the departure of the snow, which is all gone from the foothills and most of the higher peaks, miners are resuming work and bending their energies to the further development of the numerous claims unearthed within the district's extensive area. Present appearances and preparations augur well for an active and profitable season. Many of the lodes discovered carry free gold, and some exceedingly rich and beautiful specimens are exhibited, notably those from the claims owned respectively by Raabe & Jones and the Choate brothers. The latter-named gentlemen are constructing a couple of arastras, which are on the eve of completion. They will have jointly, capacity to reduce three tons of ore per day, and will be run by water-power. Work still continues at the famous Ohio mine, and it is reported that the Golden Era and Great West mines may soon pass into the hands of Utah capitalists. These properties are pronounced very valuable and are

owned by H. H. McCollay. Salt Lake mining men seem alive to the importance of securing properties in this richly mineralized zone.

Robinson District.

BULLION.—*Pioche Record*, March 15: From a reliable source we learn that the mine at Robinson district, owned by Mr. Fetterson, has produced \$30,000 since last fall, and during the past two months the product has been \$10,000. The ore is shipped to the Eureka Consolidated Works for reduction.

Union District.

CINCINNATI CO.—*Belmont Courier*, March 19: The mines owned by the Cincinnati Co., Union mining district, will soon be added to the list of bullion producers. These mines yielded some very rich ore in the early days.

ARIZONA.

MOHAVE COUNTY.—*Miner*, March 16: John Buckley sent over a couple of tons of lead ore from one of his claims near Chloride. Ore is coming into the sampling works more freely than at any time during the present year. Wm. Brandon brought over 1½ tons of ore from the Pennsylvania mine on Thursday, which went very well. Tom Burch brought up nine sacks of very rich ore from the Hibernia mine, Cedar district, but has not had it worked yet. The sampling works were busy yesterday and this morning putting through 10 lots of ore from Prescott, about two carloads in all. George Mendez had four tons of ore from the Illinois mine worked last week, and George went home very well satisfied with the pecuniary result. Michael Labrosse brought over 1200 pounds of first-class ore from the Independence mine at Chloride, of which he has a portion leased, which went over \$800 to the ton. He also had about half a ton of second-class ore which worked over \$200. Messrs. Potts and Kenney were in town for a few hours last Sunday from Wallapai mountain. The claim they are working on is one located by Gus. Gatewood some 12 or 15 years ago, and from which he took out several sacks of ore that milled over \$4000 to the ton. The claim is now owned by Mr. Potts, who is trying to find another pocket of the same kind of ore. John Burt is in town from the Congress mine, Cedar district, and informs us that he has a pack train at work hauling ore from the mine to Owen's Spring, from whence it will be hauled to Yucca station and thence by rail to Kingman. Mr. Burt has a large body of ore in sight, and can take it out faster than he can get it packed over the mountains. He expects to keep an eight-mile team at work between Owen's Spring and Yucca.

COLORADO

CRESTED BUTTE.—*Elk Mountain Pilot*, March 19: Prospects of an early season as well as a prosperous one in our camp are now well assured. There is less than one-half the amount of snow on the mountains as usual at this season of the year, and ore-packing will begin in April or early in May. The superintendent of the Augusta mine writes that they want to put in a "big season's work," which means the putting in the new cable to the tramway, and running down the thousand or 1500 tons of ore now on the dump, the building of a mill to treat the same, the putting on of a large force of men at the mine, taking out the large bodies of ore now exposed, and sending it down along the iron cable. The output of the Augusta this season is estimated to be from 4000 to 6000 tons of ore from the 1st of June to the 1st of January. Hoisting works will likely be put up at the mine and the necessary buildings for continuous winter product of the mine. The Excelsior will produce perhaps three or four times the amount of ore ever mined any previous year, as we understand that a large force will be put on as soon as the packing begins. The extension of the Excelsior, belonging to Cummings & Co., of Monarch, will start up for continuous work the 1st of April, and have shipping ore to start with. The Gift will likely resume the driving of their entry tunnel, and it is expected that within a few feet pay ore will be reached. The Donning mine is steadily at work opening up ore bodies, and will begin shipping as soon as practical. The Buffalo lode will begin work on the contract, and it is expected that this property will have ore to ship this season. J. C. McQuarrie has resumed work on his property, and is confident of being rewarded early in the future for his perseverance and hard labor with pay ore. Altogether, the winter's work, now so nearly over, has been very satisfactory, with no misfortunes or accidents and lots of good ore opened up.

IDAHO.

SILVER CITY.—*Avalanche*, March 19: We are informed by a gentleman in Silver City that a company has been organized to work the Morning Star mine north of town; that new machinery has been purchased for hoisting works, and that by the time the snow is gone, it will be on its way here. This will be gratifying news to the people of Silver City, who know very well what rich ore the mine has produced in the past, and that as the mine has never been worked to any great extent, there must be more to be taken out. The shaft has been sunk to no great depth, yet there is good ore at the bottom of the shaft and in the north level of the mine. South of the shaft no work has been done, though the south side of the same shows good ore. The first work that this company will do will be done in sinking the shaft, and in opening up the mine for permanent work. The mine carries rich ore.

MONTANA.

BIMETALLIC.—*Phillipsburg Mail*, March 17: The main shaft is down 75 feet below the 200-foot tation. Ground breaking well. Three 8-hour shifts, assisted by Rand drills, are making excellent progress. The header of the 200-foot working level east of the crosscut intersection is in 110 feet with about 3½ feet of pay-rock, of high-milling grade, to the footwall. The level west of crosscut shows from the intersection for a distance of 30 feet about 12 inches of good rock. This, however, has pinched out as the level advances, the face showing the vein 65 feet from the crosscut, to be wide and strong, but with no pay rock to speak of. This is to be expected, however, as the ores of the Granite occur in

chutes, the intervening ground being occupied with usual porphyritic filling. The stopes over the crosscut intersection are up 30 feet, the ore widening as the ground is broken west. From all indications the vein was cut on the western slope of an immense ore chute, which will beyond any doubt continue to the Granite extension ground west end line. The developments show a marked improvement in the quality and width of the pay rock, as the 200-foot level is driven east. No ore is being broken to exceed two running feet per day. During the past week a shipment was made of selected rock. It is not the intention of the management to proceed to active exploitation of the ores of the Blaine mine until such time as the future reduction works of the company are completed and ready for work.

NEW MEXICO.

MILLS AT WORK.—*Cor. Clifton Clarion*, March 19: Leitendorf, the old mining camp near here, is booming up and shows a possible future; two mills, one of 20 stamps and the other ten, being steadily at work with two shifts. The last Chance mine is being again worked successfully, and the ore shipped to the Socorro smelter.

OREGON.

MINERS BUSY.—*Jacksonville Times*, March 19: Miners are still busy making the best of the abundant supply of water. Work has been resumed on the Swinden ledge in Rock Point precinct, and better quartz than ever has been struck. Torrey & Morrison, of Anderson Creek district, turned the water into their ditch this week and are ground-sluicing with excellent results. The warm weather of the past fortnight has had some effect on the water supply, but the spring rains will no doubt make up the deficiency. Wm. Deneff had a lot of new hydraulic pipe made in this place last week, which is already in position and doing good work. A. H. Maegly this week manufactured quite a string of hydraulic pipe for C. O. Bigelow, of Williamsburg district, who is mining on an extensive scale. Klippel & Baume's mill on Shively gulch will commence crushing quartz next week. A considerable quantity of ore has been taken out of the El Dorado ledge, which will probably be crushed first. The Sterling M. Co. has failed to assume possession of Saltmarsh Bros.' placer mines in Stellingville precinct, for which they bargained some time since. The original proprietors are again at work, having commenced operations this week.

UTAH.

PARK NOTES.—*Record*, March 19: Work on the Whitehead group is being prosecuted with vigor. The ledge is looking well, and before long we hope to chronicle the fact that the lucky owners have struck it rich. Discouraging reports come from the Sampson. The leasers have thrown up a portion of their contract, and only ten men are at work in the mine. Unless something takes a turn soon very little ore will be extracted this season. Notwithstanding all this the Sampson is unquestionably a good mine and ought to be made to pay. A. M. Grant, formerly chief engineer of the Ontario mill, is up from Salt Lake on a special mission of short duration. Mr. Grant has charge of making the improvements and repairs to the Crescent concentrator, preparatory to starting up for the season's work, about April 5th. The concentrator will be thoroughly overhauled so that another year's successful run can be made. Thomas Stringer will be foreman of the concentrator. During the week the Crescent shipped 272,750 pounds of first-class ore. The Ontario shipped on the 16th (Wednesday) 42 bars of bullion, containing 24,674 fine ounces of silver. On the 15th (Tuesday) there was shipped to the Marsae mill seven bars of Daly bullion, containing 8124 fine ounces of silver.

WYOMING.

AROUND ATLANTIC.—*Cor. Salt Lake Tribune*, March 19: The Carissa mine still rolls the golden ore out at the rate of six to seven tons per day, and every foot that the stopes are driven shows a marked improvement in the richness of the ore; at the present rate this company will have 400 or 500 tons of ore on the dump by the 1st of May, ready for the mill that they intend to erect for the purpose of milling their quartz. Mr. Philip Harsh is at work developing his group of mines which are showing up well. The Carry Shields still looks as well as ever; the vein varies from 2 feet to 30 inches of high-grade ore. The owners have driven a 65-foot level east on their ledge at the bottom of the incline. This mine shows good \$35 ore from top to bottom in all the drifts and stopes. The Gould and Curry is showing up well; the owners have uncovered four feet of solid ore that will pay them a handsome royalty after paying all expenses of extracting, hauling and milling. The owners of the Poor Man's Lode are pushing developments as fast as possible, and from present appearances this mine will equal the Gould and Curry, of which it is an extension. The Garfield still holds her own with the balance of the mines of the camp. The lessees have about 140 tons of ore on the dump and thousands in sight. The Garfield is another one of the worked-out mines of the country. These worked-out mines are proving to be the best-paying properties of the country. The owners of the Diana have cut through into the old works and expect in many days to astonish the rest of the mining men of the camp. This mine as it is, would be one of the paying mines of the camp if they had the proper machinery. The Mary Ellen is another one of the paying mines of the camp; the owners had to close down for the want of powder as there is none to be bought for love or money.

THE LEWISTON MINES.—The Burr mine discovered last fall is situated about one mile due south of the Bullion mine. The vein is about four feet wide; plenty of the quartz will yield from \$5 to \$7 per pound by pounding it up in a hand mortar. The Anaconda, owned by Mr. John Charles, is a fine property for a large company to take hold of; the vein is from eight to ten feet in width, of very fair quartz. The Ruby lode claim is one of the coming mines of the Lewiston mining district; the owner has opened three distinct ledges on this claim. I would not advise any one to come in here much before the middle of May. There is plenty of room for prospectors, but men hunting work had better stay away until active operations are commenced.



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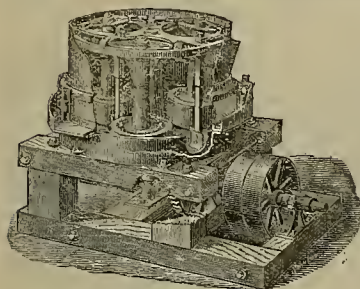
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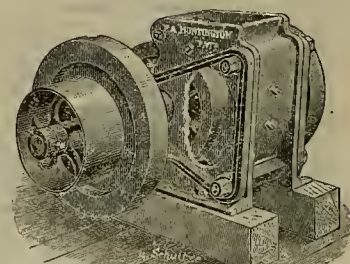


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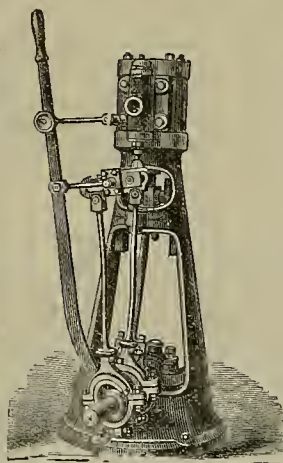
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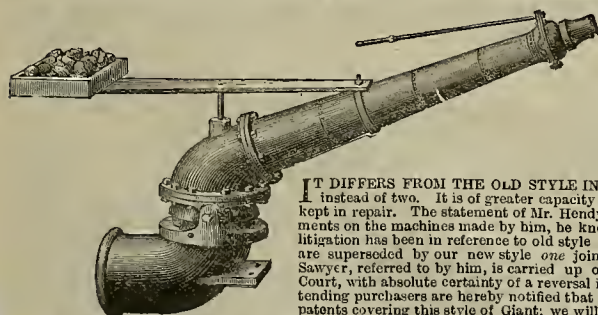
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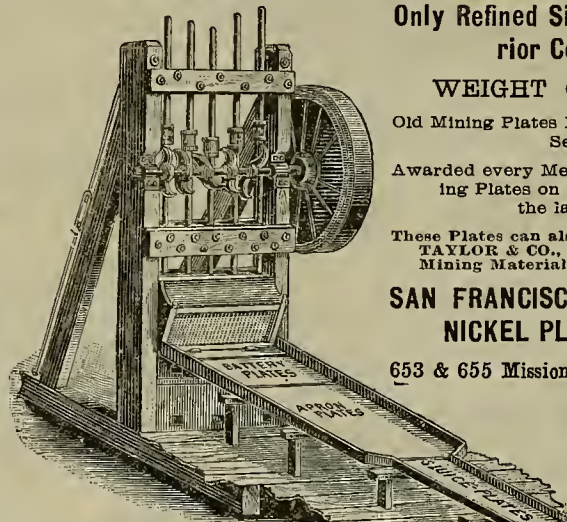
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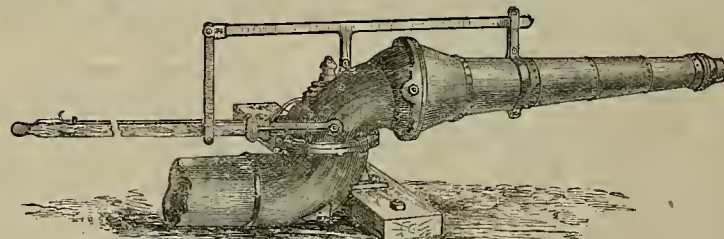
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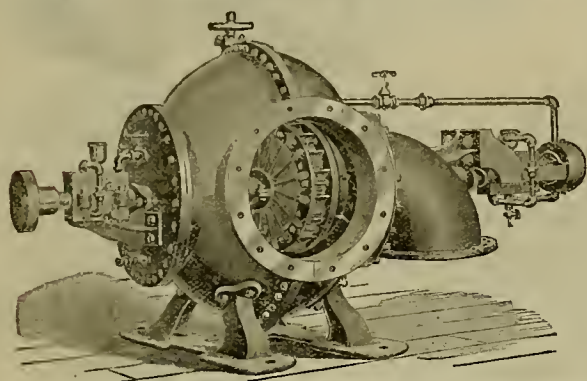
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359,438.—BOTTLE SAFE—D. Getelson, S. F.
359,395.—CABLE RAILWAY CROSSING—H. H. Lynch, S. F.
359,358.—CIGAR-TIP PROTECTOR—P. Mish, S. F.
359,403.—AXLE AND WHEEL—J. Pettinger, Carpinteria, Cal.
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Mining Share Market.

The stock market is rather inactive. The dealers seem to be waiting for something definite on the Comstock. The Virginia Enterprise says, in this connection: There is an unaccountable wait at the Crown Point and Belcher mines. And, too, the wait comes just at a time when all thought great activity would be seen. The Santiago mill-wheel has been repaired and the mill is waiting, and the Mexican mill, which has been taken from the Savage, is waiting; everything at the Crown Point and Belcher seems to be awaiting the return of Superintendent S. L. Jones.

At the Chollar and Potosi they have been waiting to put up a mill, and now the Savage and Norcross folks must wait for milling facilities. Though they may be obliged to wait for some time at the Savage and Norcross to obtain mills, there will be no waiting in the lower levels of these mines. The work of exploration will be proceeded with. In both mines much ground has been stripped ready for crosscutting on the 1200 and 1300 levels, and all the levels from the last-mentioned up to the 700 level will be thoroughly explored without delay. In the part of the two mines where this prospecting will be done the ground is nearly all virgin. The management are pushing all work as rapidly as possible—in connection with the Chollar and Potosi—with this end in view. The big double drift on the 1300 level is being pushed at the rate of 60 feet a week to connect with the old Chollar incline. This will be another valuable connection for all purposes.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Locomotive, March 19, \$12,000; Con. Virginia and California, 21, \$61,099; Moulton, 16, \$21,200; Bluebird, 17, \$18,992; Alice, 16, \$25,295; Silver Bow, 16, \$90,444; Hanauer, 17, \$51,000; Bannock, 19, \$30,500; Hanauer, 19, \$50,500; Bannock, 20, \$900; Hanauer, 20, \$52,500; Alice, 22, \$13,213; Hanauer, 22, \$12,750. Last week's mineral shipments from Salt Lake were 16 cars bullion, 416,792 pounds; 29 cars silver and lead ore, 862,150 pounds; 10 cars copper ore, 274,300 pounds; 2 cars common lead, 76,525 pounds; total, 57 cars, 1,629,767 pounds.

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Gould & Curry S M Co.	Nevada.	55.	50.	Mar.	3.	Apr.	11.	May	4.	A K Durhrow	309 Montgomery St	
Hazard Gravel M Co.	California.	1.	03.	Jan.	26.	Mar.	1.	Mar.	28.	J T McGeoghegan	328 Pine St	
Hale & Norcross M Co.	Nevada.	33.	50.	Mar.	9.	Apr.	14.	May	4.	J F Lightner	329 Montgomery St	
Inyo Marble Co.	California.	1.	01.	Mar.	15.	Apr.	13.	May	8.	O F Van Riefen	524 California St	
Loose Jack M Co.	California.	1.	05.	Jan.	27.	Mar.	7.	Mar.	28.	J M Buffington	309 California St	
Lady Washington M Co.	Nevada.	6.	25.	Jan.	28.	Mar.	7.	Mar.	28.	W H Watson	302 Montgomery St	
Mayflower G M Co.	California.	25.	25.	Jan.	28.	Mar.	25.	May	16.	J Morizo	328 Montgomery St	
May Queen M Co.	Nevada.	2.	50.	Mar.	10.	Apr.	14.	May	4.	J F Lightner	329 Montgomery St	
Northern Belle Isle M Co.	Nevada.	12.	50.	Mar.	14.	Apr.	19.	May	11.	J W Pew	310 Pine St	
Overman S M Co.	Nevada.	57.	30.	Jan.	21.	Feb.	25.	Mar.	18.	G D Edwards	414 California St	
Occidental M Co.	Nevada.	8.	40.	Feb.	3.	Mar.	10.	Mar.	31.	A K Durhrow	339 Montgomery St	
Potosi M Co.	Nevada.	27.	40.	Mar.	9.	Apr.	14.	May	4.	C E Elliot	309 Montgomery St	
Rebecca Manufacturing Co.	California.	1.	50.	Feb.	12.	Mar.	21.	Apr.	5.	W H Phelps	17 Drumm St	
Phoenix Con M Co.	California.	2.	14.	Jan.	26.	Mar.	5.	Mar.	28.	C Collichon	516 California St	
Richfield M Co.	California.	3.	12.	Jan.	9.	Apr.	15.	May	12.	G L Lansing	4th and Townsend St	
Savage M Co.	Nevada.	67.	50.	Mar.	10.	Apr.	12.	May	2.	H Holmes	309 Montgomery St	
Spring Valley M Co.	California.	2.	24.	Jan.	22.	Mar.	5.	Apr.	4.	H Pichor	320 Sansome St	
Sierra Iron Co.	California.	6.	25.	Feb.	17.	Mar.	30.	Apr.	23.	H P Bush	431 California St	

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Belmont M Co.	Nevada.	J W Pew	.....	Mar 25
Con Washoe M Co.	Nevada.	J MacQuinn	.....	Mar 24
Jackson M Co.	California.	M Hubbard	.....	Mar 24
Mt Cory M Co.	California.	A K Durhrow	.....	Mar 24
Original Old Hill M Co.	Nevada.	J M Buffington	.....	Mar 24
Sutro T Co.	Nevada.	P W Ames	.....	Mar 24
San Jose de Gracia M Co.	Mexico.	A J Moore	.....	Mar 24
Trinity M Co.	California.	J M Selfridge	.....	Mar 24

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada.	A W Havens	.....	Mar 4
Paradise Valley M Co.	Nevada.	W Letts Oliver	.....	Mar 4
Silver King M Co.	Arizona.	J Nash	.....	Mar 15

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar. 3.	WEEK ENDING Mar. 10.	WEEK ENDING Mar. 17.	WEEK ENDING Mar. 24.
Alpha.....	3.00	3.25	3.25	4.00
Alta.....	1.30	1.50	1.60	1.70
Andes.....	.90	1.15	1.15	1.30
Argenta.....	2.50	2.75	2.85	3.10
Belcher.....	.70	.70	.70	.70
Best & Belcher.....	7.75	11.15	11.15	12.15
Bullion.....	2.20	2.50	2.80	2.85
Baltimore.....	.40	.40	.40	.40
Bodie Isle.....	.30	.30	.30	.30
Bodie Con.....	2.65	2.85	2.85	3.30
Benton.....	.30	.65	.50	.75
Bodie Tunnel.....	.15	.15	.15	.15
Bulwer.....	7.50	7.50	7.50	7.50
Con. Va. & Cal.....	1.50	1.75	1.75	1.75
Challenge.....	2.00	2.25	2.15	2.80
Champion.....	.00	.75	.75	.75
Con. Va. & Cal.....	.75	.75	.75	.75
Confidence.....	.75	.75	.75	.75
Con. Imperial.....	.25	.25	.25	.25
Caledonia.....	.52	.65	.50	.55
Con. Pacific.....	.30	.35	.30	.30
Crown Point.....	3.50	3.50	3.50	3.50
Crocker.....	1.00	1.50	1.00	1.00
Central.....	.55	.60	.60	.75
Dudley.....	.15	.15	.15	.15
East B. & B.....	1.55	1.50	1.40	1.40
Excelsior.....	1.50	1.50	1.40	1.40
Grand Prize.....	.30	.30	.30	.30
Gould & Curry.....	3.30	5.25	5.40	6.00
Hale & Norcross.....	4.60	5.25	4.75	5.00
Holmes.....	2.95	3.00	3.00	3.00
Independence.....	.15	.15	.15	.15
Iowa.....	.55	.60	.70	.75
Julia.....	.50	.60	.35	.60
Justice.....	1.10	1.40	1.40	1.40
Kentuck.....	.70	.75	.80	.80
Lady Wash.....	.15	.40	.50	.55
Martin White.....	2.60	3.00	2.60	3.00
Mexican.....	5.25	6.00	5.50	6.75
N. D. D. Co.....	.45	.50	.50	.50
Northern Belle.....	.90	.90	.95	1.00
Navajo.....	4.50	4.70	4.60	4.80
North Belle Isle.....	1.15	1.50	1.40	1.40
Niagara.....	.45	.50	.45	.45
North G. & C.....	2.50	3.00	3.20	3.80
Occidental.....	.85	.90	.95	1.10
Ophir.....	1.50	1.50	1.60	1.70
Overman.....	.60	.75	.60	.65
Perkins.....	.60	.75	.60	.65
Peer.....	.47	.50	.45	.50
P. Sheridan.....	.09	.10	.09	.10
Silver Star.....	1.50	1.50	1.50	1.50
Savage.....	.45	.50	.45	.45
Seg. Belcher.....	4.10	4.80	4.40	5.25
Sierra Nevada.....	.30	.40	.35	.40
Silver Hill.....	.20	.25	.25	.25
Silver King.....	.35	.35	.35	.35
Scripps.....	1.35	1.80	1.50	1.75
Syndicate.....	4.40	4.50	4.80	5.25
Union Con.....	3.35	3.65	3.55	4.00
Utah.....	1.35	1.80	1.50	1.75
Yellow Jacket.....	4.40	4.50	4.80	5.25

Sales at San Francisco Stock Exchange.

THURSDAY Mar. 24, 1887.	100	Independence.....	25c
100 Alpha.....	3.50	200 Iowa.....	80c
500 Alta.....	2.10	50 Julia.....	55c
100 Andes.....	1.10	100 Justice.....	1.60
300 Argenta.....	7.00	75 Kentuck.....	1.50
100 Atlantic.....	.45c	100 La. Panza.....	1.80
1150 B. & Belcher.....	7.75	600 Mexican.....	5.25
740 Bullion.....	2.30	100 Mt. Cory.....	.71
200 Bodie Con.....	2.65	1250 Navajo.....	1.10
375 Belcher.....	.3	1000 N. Belle Is.....	.25
180 Baltimore.....	1.60	N. D. D. Co.....	.45
870 Belle Isle.....	70c	1495 Ophir.....	.37
450 Benton Con.....	.65c	180 Overman.....	1.55
100 Bulwer.....	1.20	100 Occidental.....	3.70
750 Chollar.....	1.10	100 Potosi.....	.50
255 Con Va. & Cal.....	.15c	450 Peer.....	.50c
250 Crown Point.....	.30	300 Peerless.....	.50c
100 Crocker.....	.80c	1325 Savage.....	.54
500 Central.....	.50	300 Scripps.....	4.15
100 Caledonia.....	.50	775 Sierra Nevada.....	4.15
100 Excelsior.....	1.60	250 Union Con.....	.24
880 Gould & Curry.....	4.45	300 Utah.....	.11
550 Hale & Nor.....	4.60	100 Weldon.....	1.20
100 Holmes.....	3.00	100 Yellow Jacket.....	4.70

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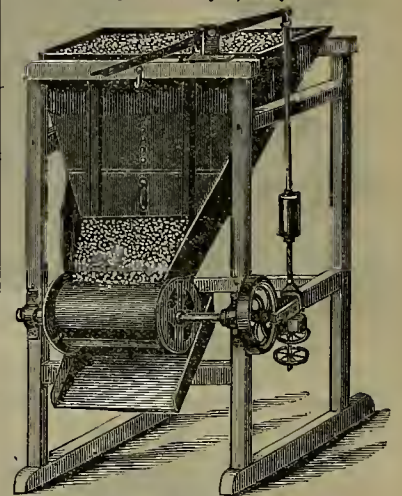
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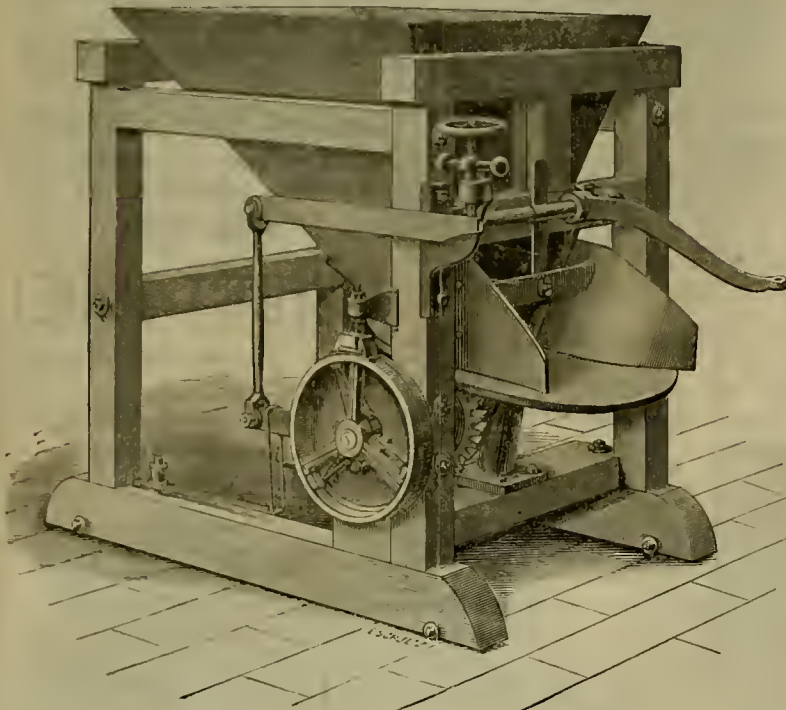
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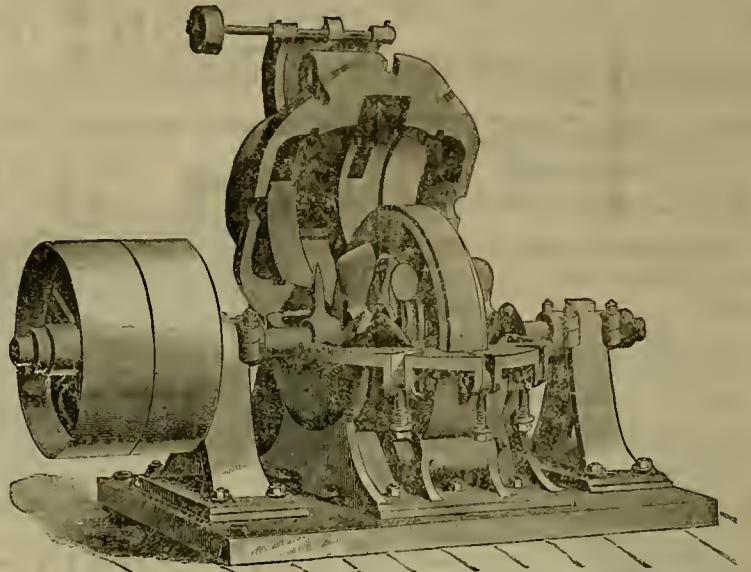
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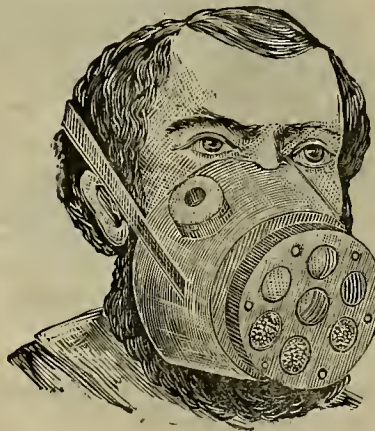
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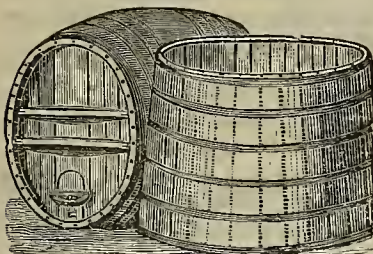
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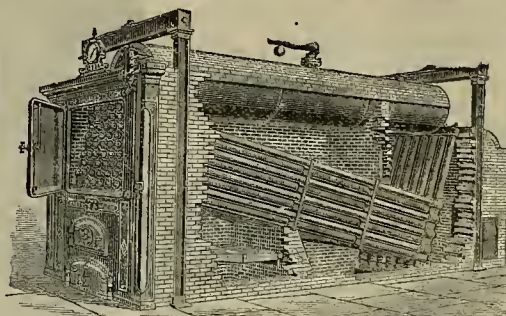
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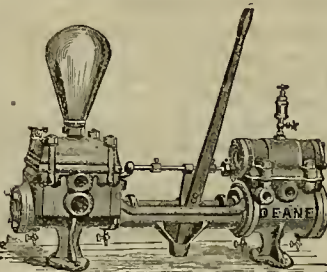
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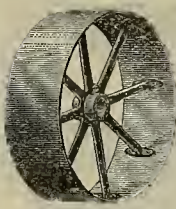
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A few copies of this work, the only one ever published
treating of Pacific Coast Coal Mining, have been obtained,
and are for sale at this office for \$2.50 per copy. It was
written by W. A. Goodyear, Mining and Civil Engineer,
formerly of the California State Geological Survey.

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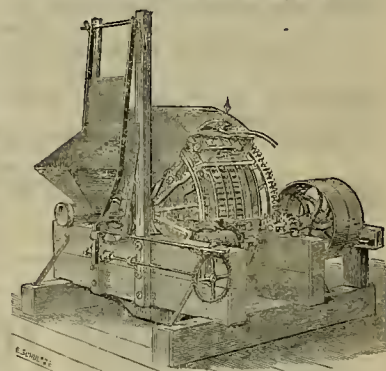
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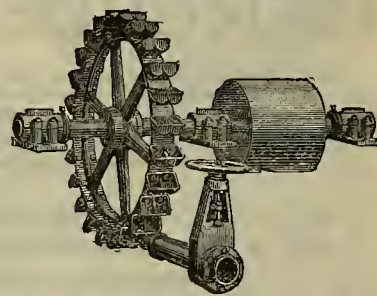
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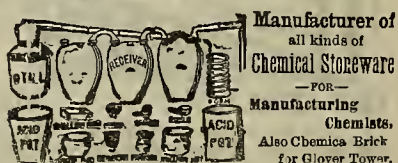
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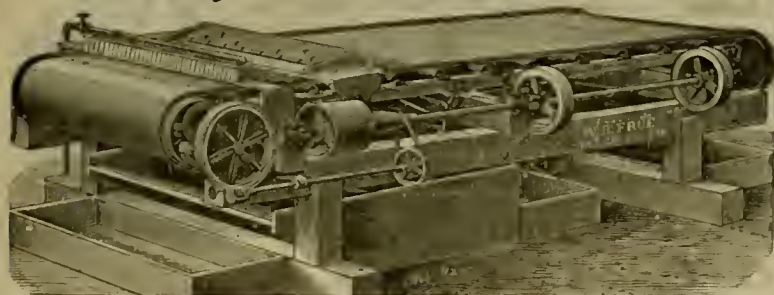
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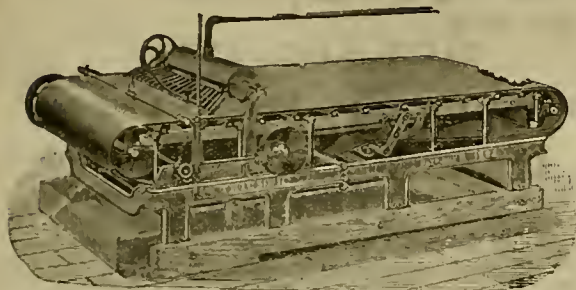
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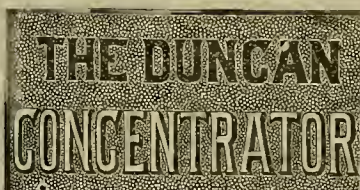
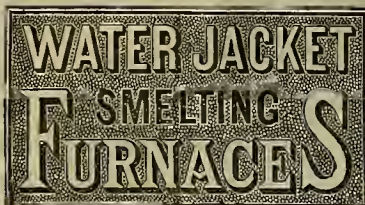
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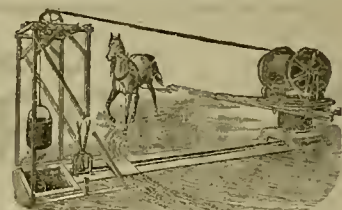
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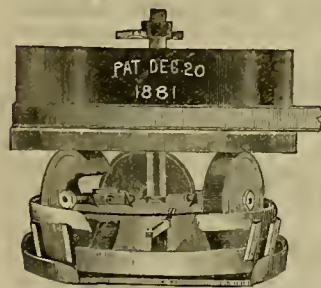


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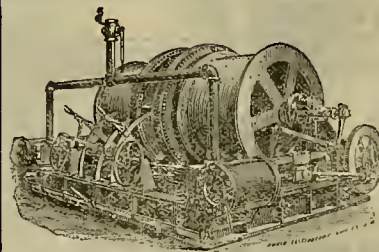
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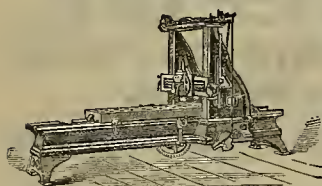
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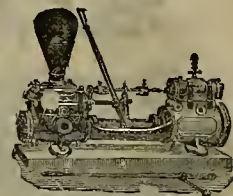
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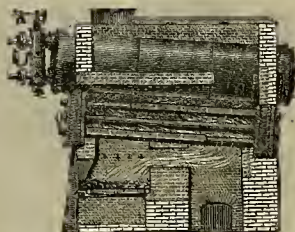
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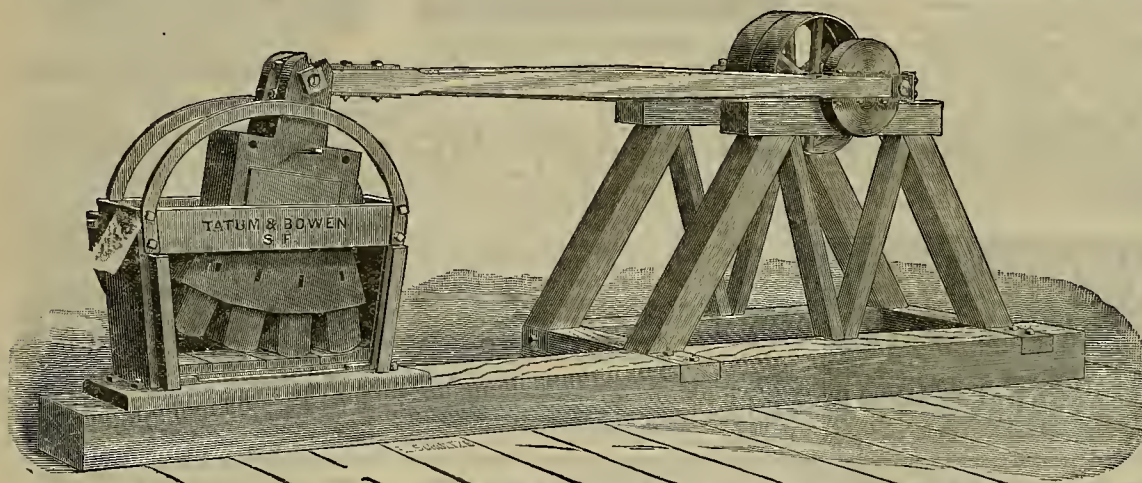
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SAN FRANCISCO, SATURDAY, APRIL 2, 1887.

VOLUME LIV.
Number 1874

Richards' Patent Hydraulic Machinery.

NUMBER I.

We purpose, in the present and some succeeding numbers of the PRESS, to publish engravings and descriptions of a new system of water-raising machinery, invented by Mr. John Richards, who introduced centrifugal pump manufacture in this city five or six years ago.

The first machine we will notice is a hydraulic ram, and in that connection remark that during two years past, this old machine, that, like the blacksmith's anvil, was thought to be perfect, has moved on to a new place among water-raising machines, and has been the subject of some very remarkable experiments in England, where an efficiency of 80 per cent has been gained with a ram of large size.

Mr. Pearsall, a member of the Institution of Civil Engineers, London, writing on the subject of hydraulic rams recently, says: "Almost the only application of the principle has been the common hydraulic ram invented by Montgolfier, 100 years ago, and very little improved on since. Almost all attempts at improvement have been only slight modifications, and have retained features that have unfitted these machines for use on any but a small scale, as more or less violent shocks were an inevitable accompaniment of their action. Indeed these violent shocks have come to be regarded by many people as essential to the working of such machines. Hence the name 'ram.'"

"Careful consideration, however, accompanied by experiments, demonstrates this as an error. Violent shock is not essential to the action of the machines on this principle, though it is an invariable accompaniment of all existing machines. But it can be avoided, and by this avoidance the efficiency is not only not impaired but is increased."

This "revolutionary" proposition respecting hydraulic rams seems plausible enough when we consider that a shock or blow always indicates a loss of power in machinery of almost any kind.

Mr. Richards, in his smaller size rams—those of less than eight-inch—employs two valves instead of one. These valves are nearly balanced, so they close with much less shock than a single valve. They moreover are not shut by the rush of the water around the valves, but by the action of the water after it escapes.

Fig. 1 shows one of these rams arranged for a low head. The water issues at the top and bottom of the chamber at the right; that from the top strikes under the shield seen on the stem and is reversed by a curved surface beneath and thrown downward, so the impact and also the reaction is employed to close the valve. This operation is performed much quicker than with the old style of rams, but as the valves above and below are nearly balanced, there is but little shock compared to what occurs with a single valve—that is, there is but little shock on the valves or other wearing parts, although the pipes receive the full force. The weight and lever are employed in the case of low heads when the water pressure is not sufficient to sustain the valves with the small difference in their area. In other cases this weight is dispensed with.

In the larger sizes Mr. Richards proposes to adopt the isochronal valve movement, by which all shock is avoided. We see no reason why in such case a hydraulic ram of any size cannot be made and work successfully. Those em-

ployed by Sommeiller at the construction of the Mont Cenis tunnel had 30-inch pipes, and some of recent construction are even larger.

Another machine is an improved centrifugal pump, one of which is shown in Fig. 2.

These pumps have a single inlet at one side—a form of construction that has simplicity and

runner, so that the pressure from each side is balanced at the periphery. This adds nothing to the cost or intricacy of the pumps, while it permits a single suction of large diameter accessible and removable, as shown in the drawing.

Another improvement in these pumps con-

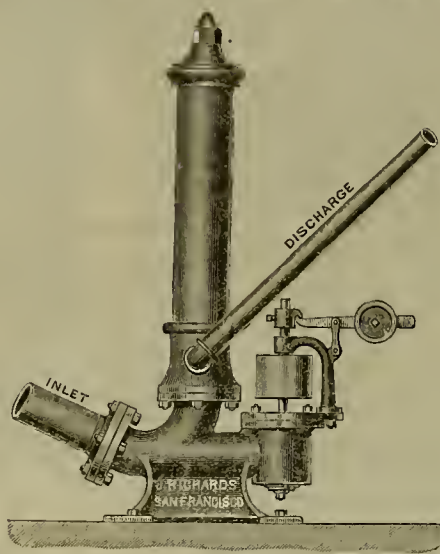


Fig. 1.—RICHARDS' PATENT HYDRAULIC RAM.

convenience in its favor, also a saving in first cost, but has been impossible in most cases, because of the side-thrust on the pump-wheels. This thrust has been so serious a matter that many makers have adopted a forked suction, taking

sists in placing the packing gland for the spindles inside the main bearing, next the water, and being on the suction side, no water or other liquid being pumped can come in contact with the bearings. The value of this can be im-

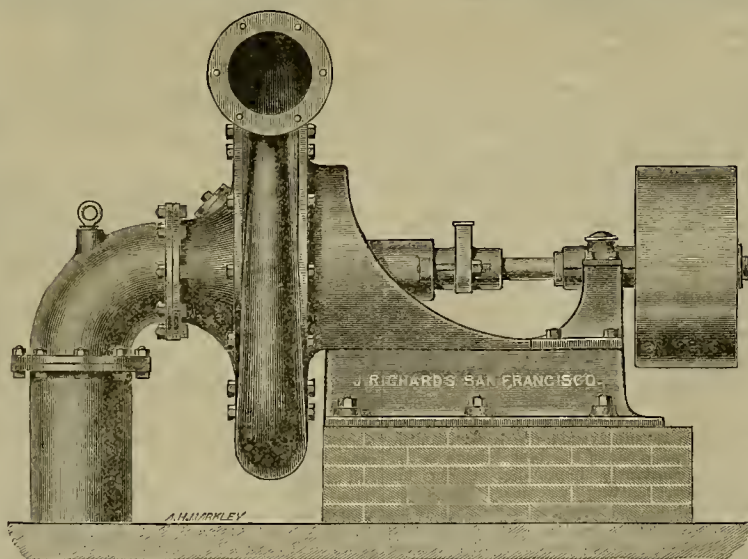


Fig. 2.—RICHARDS' PATENT CENTRIFUGAL PUMP.

the water at each side, and by that means attaining a balanced action.

In Mr. Richards' pumps this balancing of the wheel is accomplished in a very simple manner, by having an equal centrifugal action on each side of the runner, but passing nearly all the water at one side. There is a plate disk with curved vanes on each side, and perforations through the disk at the center, which permits a small part of the water to pass behind the

runner when muddy water or sand is passing through a pump. A patent claim on this method was long contested at Washington and finally allowed by the board of appeal after all possible references had been examined and exhausted. These pumps are made to a scale of systematic proportion, the water-ways being as uniform as possible and all the curves easy. The proportions of all parts are carried out in tables, one drawing answering for all pumps

from 2½-inch to 10 inch, and one other drawing for all sizes from 10 to 30-inch. This method of delineating is a recent invention of Mr. Richards, who has applied it to various machines.

Bogus Quartz.

The joke about the green miner who found a "brass mine" is quite an old one; but it is no joke for a man to buy a gold property and then find it is a "brass mine" in reality. An instance has just come to light in this city which shows rather a new feature in mining ewindles. It is a case where the salters not only prepared the metal, but also prepared the rock in which the metal was placed.

The samples which we saw were "bogus quartz," carrying brass—just plain, simple brass. These "ore" samples came from another State to a San Francisco merchant, to whom they were sent by a friend who wisely wanted reliable information from a California assayer. They were taken to a metallurgist, in this city, for examination. The latter gentleman determined that the alleged gold was nothing but brass. The bogus quartz appears to have been made from a kaolinized rock that is easily crushed, and while in the plastic state was salted with particles of brass like little nuggets of free gold. It was afterward dried and broken in pieces. It falls to mud when wet. These specimens were clearly designed to take in unsuspecting investors.

The supposed ore is white in appearance and shows no signs of gold or other metal on the surface. When broken and pulverized in a mortar, and horned or panned out, the little nuggets of brass remain, and have the appearance of gold. It is rather a new scheme to make both the rock and the gold, and is quite an artistic style of salting.

When soaked in water the specimens fall to pieces and disclose the method of fabrication. The brass chips on close examination show quite plainly the tool-marks by which they were made. The specimens are well calculated to deceive persons not familiar with the subject.

It may be mentioned incidentally in this connection, that what is known as California quartz jewelry, so common in this market and so much admired by visitors here, is by no means all it is represented to be. Good quartz for the purpose became so scarce that the substance is now manufactured. A transparent siliceous material is prepared, which can be made more or less clouded, and then flakes or threads of gold placed thereon in any desired form. It looks almost exactly like real gold quartz and is sold as such. The East will have to look out for its reputation in some things, for bogus gold ore is more difficult to make than wooden hams and nutmegs, or shoe-peg oats.

E. L. BONNER, of Montana, says the best mine in the Territory is the Green Mountain, the stock of which is selling at \$65 a share, or at the rate of \$26,000,000 for the mine. It was discovered four years ago, and is owned by Clark, McClure and others in St. Louis. Other fine properties in its vicinity are the Bi-metallic, Black and West Granite. They are all paying handsomely.

THE Drumlunnon mine, Montana, is yielding about \$125,000 per month.

Fossil Remains.

Some Found in San Luis Obispo County.

The immediate vicinity of Templeton is rich in fossil treasures, and the laborious researches of some of our citizens into the habitat of prehistoric saurians and mammals deserve recognition and honorary membership at the bands of the Academy of Sciences. On several occasions the *Times* has recorded the unearthing of fossil bones of antediluvian monsters, but the largest exhibit in this line was accomplished a few days ago by A. Crum and J. W. Cook, who brought in a large wagon-load of monstrous petrified ribs, vertebrae, shoulder-blades and other portions of the anatomy of mammoth creatures who inhabited this country when the slowly receding ocean left it one vast watery marsh. This large collection is now exposed to public view on the south piazza of the Templeton hotel. There is no region in the State richer in fossil remains than this section, which is now from 700 to 1000 feet above the sea level, and gentlemen who combine the possession of leisure with a taste for geological research would find the country hereabouts interesting for exploration.

One of the peculiarities of the county, from a geological point, is the distribution of fossils in belts. Immediately around Templeton it appears to have been the home of mammoth saurians and mammals. Ten miles distant, on the Santa Margarita ranch, owned by General P. W. Murphy, there is an extensive and remarkable deposit of petrified oysters, on a ridge which is at least 1000 feet above the present sea level. The deposit is probably a mile in length by half a mile in width and of unknown depth. One of the specimens now in this office is nearly a foot in length by six inches in width—a perfect oyster thousands of years old. There are many larger specimens to be obtained, this one having been taken out of a wagon rut in the county road where it crosses the oyster ridges.

In another locality, about ten miles distant, on Santa Rosa creek, near Cambria, H. S. Messenheimer, while digging a well, found a perfect flint arrow-head at a depth of 17 feet, and for 35 feet the excavation penetrated a deposit of fine, small shells, an immense mound of which still exists near where the well was dug. Northwest of Templeton, near the residences of Mr. Messenheimer and Mr. Carr, both old residents in this part of the county, there is a large rock, the exposed portion of which will weigh 700 or 800 pounds, and imbedded in it is plainly discernible the upper part of an immense fossil skull, in one portion of which is a tusk about seven inches in length.

This hasty allusion does scant justice to the interesting fossil region by which we are surrounded, and is written mainly in the hope of attracting the attention and investigation of some one possessed of more scientific knowledge and more leisure than we possess for this exploration of the geology of a region which is rich in promise and indications.—*Templeton Times*.

At Quijotoa, Arizona.

Mining matters at the Quijotoas are looking up, and while there is no semblance of a boom, a great deal of activity exists, and the fact is being better demonstrated daily that this is one of the coming great mining camps of this Territory. The slow and steady work of months and years is just revealing the rich secrets of these noble hills, and Dame Fortune, that has so long coquetted with the toiling miner, is at last looking with sincere favor upon her persistent wooer, and is ready to break the bolts and hars of nature's locksmith, and go forth to reward his devotion with her perpetual smile.

On the west side the greatest activity is noticeable and the most developments are being made there. In the Weldon, the heart of the tunnel is all in ore, a late and rich find, which assays from \$50 to \$500, the average being over \$100. The ledge on the surface pitches toward the tunnel, and it is known that all between them is good ore. At the mouth of the tunnel there is another very promising claim that shows excellent ore. Work on the Weldon is conducted both day and night, and is progressing with satisfactory rapidity.

At the Central, water in their new well was struck at a depth of 55 feet, and everything is now progressing favorably.

The Locomotive is showing more and better ore than ever before. Hank Murray has displayed great ability as superintendent, and it is to his judgment and skill that it has been made a brilliant success. More ground is being opened, and there is plenty of ore to warrant the employment of the full capacity of the mill, which will very shortly be running its 20 stamps. The Bonanza tunnel is being worked by a day force only, and about 60 men are employed on this and the Locomotive.

A town called the Locomotive has been started on the west side. There are, among other necessities of a first-class town, two saloons with the usual quota of games of chance. Brown and Moloney run these institutions, and the boys all play poker but bar professionals. A boarding-house and chop-house have been started, and a few days ago a watchmaker and general handy man from San Pedro established himself in the new camp. Half a mile south is another boarding-house for the Bonanza tunnel men, and a saloon was also started there last

Saturday. The dry washers at the Horse Shoe, five miles north, are doing well. About 35 men are at work, and they are taking out from \$5 to \$10 per day per man. This is regarded as a pretty good opening for placer miners who do not look for a sudden bonanza.

NEW PLACER DIGGINGS.—Washed gold was found in the gravelly beds of the canyons in the east range of the Humboldt mountains by prospectors in early days, but as the idea then prevailed that no gold mines of any consequence, either in quartz, lead or placer, existed in Nevada, no systematic method of working the gravel was attempted. Of late years several leads in the east range, notably the Ross and Golden Chariot companies' mines at Dun Glen, have been worked exclusively for gold, and the fact has been established that not only paying gold-bearing ledges, but placer mines, exist in many parts of the Humboldt and east ranges. Recently two prospectors, Tom Hannigan and E. Smith, found rich auriferous gravel in a canyon in the east range, almost directly across the valley from Unionville, and a few miles south of Kyle's Hot Springs. The discoverers located several placer mines and have disposed of some of them to Chinese. Pat Hansy, who returned from that section a few days ago, says that Chinamen are swarming into the new diggings, and there are now 100 or more of them in the canyon. They are building a storehouse there, and a large number of them are at work sluicing and rocking the gravel. He could not ascertain what the diggings are paying, but the fact that Chinese merchants are building there indicates that the mines are good. There is considerable water in the canyon in the spring and early summer months, and the diggings are said to be quite extensive.—*Winnemucca Silver State*.

A BURIED TOWN.—A few days ago two prospectors, while wandering over the foothills east of the city, accidentally stumbled on signs of previous habitation buried under heaps of sand which had been drifted by the winds of years. Having selected a point at which to make an excavation, they went to work with a will, and in a few hours had reached the floor of a small chamber in the form of a parallelogram. They found the remains of several human beings, several handsome vases carved with geometrical figures in different colors, stone axes, bammers, pieces of cloth apparently manufactured from the fiber of the yucca; several strings of beads, sea shells, arrow-heads and an abundance of fragments of obsidian quartz, and an incredible quantity of pieces of broken pottery, including several with a blue glazing. Only in one other instance have we ever heard of this color and quality of ware having been discovered in this Territory, and that was at the ancient pueblo near the Santa Rita in this country, and it indicates that the Spaniards had lived in New Mexico before the extinction of the race who inhabited this ruined and buried village. Our friends will continue their excavations, and the cabinet which will result from their labors will be offered for sale to those who cherish these objects of the past.—*Socorro (N. M.) Bulletin*.

FISH COMMISSIONERS.—A Sacramento dispatch of March 24th says: The new State Board of Fish Commissioners, composed of J. Downey Harney, of Los Angeles, J. Routier, of Sacramento, and T. J. Sherwood, has met and organized by the election of Routier as president and Sherwood secretary and treasurer. R. H. Buckingham and A. B. Dibble, the old commissioners, turned over the books and presented an inventory of the State property. J. R. Lewis, of San Francisco, son of Assemblyman Lewis, was elected license collector of the commission, pursuant to a law passed by the last Legislature, levying a tax of \$5 or more on each fishing boat. J. S. Benn, of San Francisco, was appointed a deputy fish commissioner for San Francisco and vicinity. G. Willage, also of San Francisco, was appointed a deputy commissioner and chief of patrol of the bay and rivers. He will have charge of the commissioners' launch, Governor Stoneman, and he has been instructed to be relentless in the pursuit of fish-law violators. The regular monthly meetings of the board were fixed on the 15th of each month. The next meeting will be held in Sacramento. After that they will be held in San Francisco. The employees of the commission were ordered to make monthly reports.

MOUNT CORY.—The Mount Cory mine, under the immediate supervision of R. M. Ballard, who doubtless is one of the best miners on the coast, is constantly improving. Under his management, hoisting machinery has been erected, pay ore has been discovered where no one else expected to find it, and that too in a large quantity, several tons of which are now on the dump and a plentiful supply awaiting to be stowed out. The level on the northeast drift is materially improving, and now Mr. Ballard believes that another strike of pay ore will be found on the west side of the present large ore body. The mill will soon be started up, and it is reported that Geo. W. Penter is making preparations for hauling the ore with his teams. The mine has yielded a considerable amount of money, but now that its operations are managed by such a thorough mining man, who after taking hold thereof, and in so short a time, has made such valuable developments, a handsome profit will be realized therefrom by its owners and create a boom in this section.—*Esmeralda News*.

Wood River Galena Ores.

Mining men who visit Wood River for the first time are invariably surprised at the narrowness of our ore veins, and cannot at first be made to understand how they can be more profitable to exploit than veins four times as wide. After they examine a few, however, and always with the same astonishing results as to value, they drop their prejudices and come to the conclusion that such high-grade ore as we have would prove remunerative, however narrow the veins.

The fact is, our ores "make into money" more rapidly than any others on the face of the earth, and that Wood River's high-grade ores are unrivaled. To exemplify: Take a block of ore, such as would be exposed in any mine by a short drift, but under the conditions existing on Wood River. Say that the drift exposes a length of 10 feet of galena ore, by a height of six feet and a thickness of one foot. In gold or silver mines there would only be from four to five tons of ore thus exposed. On Wood River, however, such a block of ore would yield 17 tons; and this quantity of ore, averaged at 120 ounces silver and 70 per cent lead (which is certainly below the average yield of our ores), would bring \$150 per ton, or \$2550 altogether. Only think—a block of ore, 10 feet long, six feet high and one foot thick, would bring \$2550! And this is not a rare occurrence. It is the case in most of our producing mines. On this basis a block of ore, 100 feet high and only one foot thick, would yield about 2860 tons, worth \$420,000.

As no such results were ever obtained anywhere else, it is easy to understand how visiting experts cannot grasp the condition of affairs here, nor understand why we think as much of our mines as we do. But if any of these experts remain here, from any cause, and familiarize themselves with our formations, they soon become as enthusiastic as any of us, and finally, though reluctantly, admit that our ores make money faster than any ores they ever saw.—*Wood River Times*.

Comstock Bullion Product.

Official Statement of the Output During the Quarter Ended Dec. 31, 1886.

Following is a summary of the ore and bullion output from mines in Storey county, Nev., during the quarter ended Dec. 31, 1886, condensed from the assessor's abstract statement filed at the office of the county recorder:

Consolidated California and Virginia—31,653 tons of ore of the average value of \$25.45 per ton, produced \$805,535.36 in bullion; total cost of production, \$435,969.32, leaving a balance of \$369,566.04 subject to taxation.

Savage—Total output, 160 tons; average assay value, \$11.40 per ton; gross bullion yield, \$1824.05; total cost of production, \$1618.84.

Belcher—Ore output, 10,740 tons; assay value, \$8.83; gross yield, \$89,420.48; cost of production, \$84,272.49.

Crown Point—Ore output, 10,386 tons; assay value, \$9.81; gross yield, \$101,433.78; cost of production, \$96,339.59.

Kentuck—Ore output, 3238 tons; assay value, \$12.70; gross bullion yield, \$41,144.78; cost of production, \$44,360.60.

Yellow Jacket—Ore output, 16,505 tons; assay value, \$10.04; gross bullion yield, \$165,724; cost of production, \$220,807.25.

Recapitulation.—Total ore output, 72,682 tons; bullion yield, \$1,205,083.27; cost of production, \$883,368.09. The total net bullion proceeds taxable foot up \$321,715.18, the tax upon which is \$16,630.47. This sum was paid into the Storey county treasury, Wednesday, by the various companies.

AT TOMBESTONE.—In visiting the different mines in this district, it is surprising to see the amount of work which is being done by men who own the properties—in other words, there is more prospecting being done in Tombstone to-day than ever before in the history of this camp. Mining, like all other industries, has its ups and downs. It has to contend with a ring in Wall street, but in spite of all this oppression, it is gradually forging its way to the front. There always has been some feeling not of a kindly nature between the cattlemen and the miners, but it was nothing but a prejudice and is fast disappearing. There is nothing to create or maintain feelings between these parties other than of amity. The mining man pays his full proportion of taxes, in fact the mines contribute more toward the support and maintenance of our county government and its people than any other source. Taxation rests about equal on all, and all should bear it with becoming decency and propriety.—*Tombstone Epitaph*.

MUCH as we have cause to pride ourselves on the great advancement of the anthracite coal trade, it must be conceded that in proportion the bituminous trade far outstrips it. Of a total production of coal for 1886 of over 107,000,000 tons, the anthracite output was 32,000,000 and the bituminous 75,000,000. Another particular in which bituminous coal surpasses its harder competitor is that whatever measure of trade it has gained it has held, while anthracite has had its ebbs and flows, in one year showing a decrease of fully a million tons.—*Exchange*.

Immigration and the Labor Problem.

Reliable statistics inform us that from 1820 to 1885 over 13,000,000 of foreign-born persons reached the United States as immigrants. The lowest figure of any one year was 6354, in 1853; the highest was 788,992, in 1882.

Comparing the yearly arrivals, it is found that the greater number of arrivals invariably preceded the years of our greatest depression in business. This inference, very naturally, is that these excessive foreign accessions to our population have formed an important factor in our periods of business depression.

It is apparent to the most casual observer that the great bulk of the immigration concentrates in cities and towns which are recognized as leading industrial centers, and more especially in centers of mechanical industries. Comparatively few immigrants enter upon agricultural pursuits. The unskilled immigrants resort mainly to commercial cities, where there is a large demand for unskilled labor; the skilled immigrants gravitate to the mechanical shops wherever they may be found. The following figures, giving the number of foreign-born persons, 10 years of age and over, who were engaged in agriculture, manufactures, etc., as per census of 1870 and 1880, furnish abundant proof of the above:

	1870.	1880.
Population 10 years of age and over.....	28,228,945	30,761,607
Foreign born 10 years of age and over.....	5,307,887	6,491,301
Foreign born engaged in agriculture.....	619,108	812,829
Foreign born engaged in manufactures and mining.....	929,581	1,225,787
Total foreign born engaged in agriculture, manufactures, etc., 1,548,689		2,038,616

A careful examination of these figures shows that our foreign-born population constituted but a fraction over 10 per cent of those engaged in agriculture, while the foreign element engaged in manufacturing, mechanical and mining industries represents 32 per cent of all persons so employed.

These are important facts for the consideration of our political economists. The trouble does not arise so much from the fact of a large immigration as from the manner in which that immigration is distributed; although another class of figures might be given, and, in fact, were given, in these columns some months ago, which tend to show that unpleasant complications may arise in the near future which, very likely, may call for some restrictive legislation in regard to immigration. Still, such legislation would be attended with difficulty, and would set at naught one of the cardinal principles upon which this Government was originally organized. It is doubtful if the people of this country will ever submit to fence in their territory with a Chinese wall, except it be to fence out people like the Chinese, themselves who can never assimilate with our people or their institutions—civil, religious or social. A large portion of the very best blood in this country entered into American life by a voyage across the Atlantic. Notwithstanding the many difficulties in the way of keeping this country perpetually open, as a harbor of refuge and protection to the oppressed and suffering of all nations, we must devise some means to receive and distribute those who come to us in a way by which both the corner and the resident shall be mutually benefited. We cannot conclude this brief article better than by quoting the words of a cotemporary, as follows:

Addition to population rightly distributed and in proportion to its possibilities is the soul and sinew of our development. It has made us what we are in the sovereignty of a continent and in the nations of the world. To disperse the immigrant is to desecrate our fathers' graves and to insult the verdict of our history. The whole evil consequent to foreign immigration lies in its one-sided direction and its overgrown proportions, and the task of statesmanship is in the way of curtailing its magnitudes without profaning its rights. To encourage what is desirable of population in its kind and quantity is, and will be for years to come, a national duty and a reserve source of strength and progress, while a blind and indiscriminate permit of immigration will just as surely end in catastrophe and industrial calamity.

NO DEBRIS.—While the bed of Feather river was laid here last summer it was found that no debris from the hydraulic mines of Plumas county had come down the river to that point. The river had shown only the original gravel that had been found in it by the miners who built windmills at Island Bar, Berry Creek and Whiskey Bar as far back as 1855. This is conclusive proof that the mines about Spanish Ranch, Shores Hill and Curtis' Point, above American valley, as well as those near the mouth of Spanish creek and along the East Branch, have never sent down an ounce of tailings or debris within at least 25 miles of this locality, and hence have never done the slightest damage to farming lands in the Sacramento valley.—*Oroville Register*.

FOREIGN IRON.—According to the *Iron Trade Review*, the recent American purchases of foreign iron, when simmered down to facts, amount to this: The St. Louis parties bought 10,000 tons instead of 25,000 tons, and the Chattanooga parties, in place of buying 40,000 tons, took exactly 3000 tons. Aggregate according to sensational dispatches, 65,000 tons; aggregate in fact, 13,000 tons. The story was only magnified five diameters.

The Present Mining Law.

Previous to the law of 1866 the United States had no mining laws which were applicable to the mountain regions of the West. Those who had located mining claims in the mountains had been trespassers on the public domain. The law of 1866 gave a man the right to the lode with its "dip, spurs and angles." It is evident, from a perusal of the discussions while that act was under consideration, that fissure veins were the only class of ore-bearing mines thought of. The real thing sought to be given the claimant was the lode or vein, while the surface was not of any account except as it might be necessary for convenience of working the lode.

Experience demonstrated that there were imperfections in the law, and that the provision in relation to spurs and angles would give rise to endless litigation. It was this that gave rise to the act which became the present law in 1872. It was this which caused the right to surface boundaries and all lodes within them to be clearly defined. The bill, as originally introduced, was framed by a commission appointed for the purpose, and that bill, as introduced in Congress, confined all claim-owners to their vertical side-lines, thus shutting off one's right to follow a lode on its dip beyond the side-lines. In the Senate it was amended to its present form, and made to include deposits of cinnabar. Throughout the West at that time the only kinds of ore mines which the miners knew were fissure veins; they thought of its application only to veins, as they then understood them and as geologists understood them. It was different with the scientific gentlemen who framed the bill. The miners believed in a law giving a man the right to follow a fissure vein on its dip, because they believed in making the lode or vein the thing claimed and owned.

With the lapse of years, ore deposits were found in limestones, and in contacts, which lie nearly horizontal, and are fissure veins, such as the miners believed the law applied to. The result of that belief can be seen in the way they located claims in the days of their early discovery in regions like Leadville. Many were located side by side, without any regard to the outcrop or apex. It was the natural sentiment of justice and fair play manifesting itself. It was also the best possible proof that Judge Field was in error when he ruled that miners called any form of ore body they might have their vein, and meant the word vein to apply to all forms of ore deposits. In letter that was true, but in spirit it is untrue, as the acts of the miners in locating claims in limestone showed. If they had thought and believed that the law should apply to such deposits, there never would have been any question regarding the right of the one who held the apex or outcrop to follow the ore beyond the side lines of his claim. The proof of that fact can be found in every mining camp containing the contact or limestone deposits. In the few whose claims were not located side by side, parallel with the outcrop, they were located side by side across, or at right angles with the outcrop. And in these locations there has been a very general acquiescence by the miners.

If there ever was a decision which, in the opinion of most miners, was contrary to the spirit of truth, justice and equity, it was the famous decision in the Richmond case. It is a decision, too, which was in direct opposition to the welfare and best interests of the mining industry.—*Denver Republican.*

GREATEST TUNNEL DRIVING ON RECORD.—Reports come from the engineers in charge of the construction of the Colorado Midland railroad, which show remarkable progress in tunnel driving. The Colorado Midland railroad starts at Colorado Springs and runs through Ute Pass and Eleven-Mile Canyon to Leadville. In the Ute Pass are nine tunnels, the longest about 600 feet. Tunnel No. 5 has recently been completed—length 515 feet. On the week ending November 17th, a run of 98½ feet was made with two Ingersoll "Eclipse" drills, size "D," three inches diameter of cylinder. Following are the particulars: Material, hard red granite. Heading, 8x16 feet section, commenced October 17th; completed November 17th. Contractors in charge of tunnel, McMurtrie & Streeter. Superintendent of tunnel, F. W. Dashe. This goes on record as the greatest tunnel drive that has ever been accomplished, and considering that only two drills of small size were used, it is an extraordinary record. The following certificate verifies the accuracy of the report:

ENGINEERING DEPT., COLO. MIDLAND RAILWAY CO.
Office of Tunnel Engineer,
MANITOU SPRINGS, COLO., March 22, 1886.
F. W. Dashe, Supt. of Tunnels 5 and 6, Manitou, Colo.:
DEAR SIR: Herewith I certify that your work's drive at the East heading of Tunnel No. 5 for the week ending November 17th, according to accurate measurements of the 10th and 17th of November, was 98½ (ninety-eight and one-half) feet. Section of heading being 8 feet by 16 feet. Character of rock, red granite.
(Signed) WILLIAM BREKERS,
Engineer in charge of tunnel.

Plumbers Now Licensed in San Francisco.

The Legislature just adjourned passed the following amendments to the Act regulating plumbing and drainage:

It shall not be lawful for any person to carry on business or labor as a master or journeyman plumber in any incorporated city, or in any city and county in this State, until he shall have obtained from the Board of Health of said city and county a license authorizing him to carry on business or labor as such mechanic. A license so to do shall be issued only after a satisfactory examination by the Board of each applicant upon his qualifications to conduct such business or to so labor. All applications for license and all licenses issued shall state the name in full, age, nativity and place of residence of the applicant or person so licensed. It shall be the duty of the Secretary of each Board of Health to keep a record of all such licenses issued, together with an alphabetical index to the same.

A list of all licensed plumbers shall be published in the yearly report of the Health Officer of the Board of Health.

At the last meeting of the Board of Health, Drs. Perry and Alers were appointed to act as

Santa Barbara Mission.

We give on this page a sketch of the Old Mission church at Santa Barbara. Now that Santa Barbara is feeling the effect of the new life in California affairs, as the long-desired railway is approaching the town, and varied city improvements are afoot, it is worth while for a moment to turn the mind upon the vestige of the old life of the place. The Santa Barbara mission recently passed its centennial birthday, as it was established in 1786. In the small engraving at the lower corner is given a glimpse of the general form of the building. The main structure is 200 feet in length and nearly 50 feet in width, and the wing is 130 feet long. It is upon the corridor of this wing that the main sketch is made, and the figure is a Franciscan monk. Santa Barbara mission is the only one, it is said, where the Franciscan monks still remain. The grounds of the Mission are spacious, and a ride to the spot is the proper thing for tourists.

ANNUAL STATISTICIAN.—The *Statistician* for 1887, published by L. P. McCarty, is now out. This is the eleventh edition of the *Statistician* since its beginning. It contains important changes in all its departments, innovations in its arrangement, and an increase—though not in size—in valuable matter. Over 30 additional countries have been introduced, and also a



THE OLD MISSION CHURCH AT SANTA BARBARA.

a committee to confer with the Health Officer and representatives of the Master and Journeymen Plumbers' Associations, to adopt measures for carrying out the provisions of the amended law. The committee met on Friday last at the rooms of the Master Plumbers' Association. The Master Plumbers were represented by W. F. Wilson, W. L. Daniel, James Sheppard, R. A. Vance, C. J. Riley, D. Bush, and the Journeymen by J. E. Sweeney, inspector for the Board of Health of plumbing and drainage. An informal discussion was engaged in regarding the best means of conducting the examination of applicants for licenses. It was finally agreed that the most satisfactory examination would be to ask the applicants a certain number of questions and then to have a rigid blackboard exercise, to be conducted by a practical plumber. In addition to the proper officers of the Board of Health, there will be present, at these examinations, representatives of the Master and Journeymen Plumbers' Associations. Drs. Perry and Alers said that they were content to leave the preparation of a series of questions to be asked the applicants to committees to be appointed by the two associations. This met the approval of the plumbers, and an adjournment was taken. At the next meeting final arrangements will be perfected.

A BIG TUNNEL FOR A PACK-HORSE.—Last week a pack-horse belonging to the Nevada City and Downieville Stage Company fell over the grade above Camptonville and slid down the snowy embankment 3000 feet to the North Yuba river. The drivers could not then get down to where it was, even to recover the express matter with which it was loaded, and went away giving it up for a total loss. A few days later, when James Miller was coming down with a band of cattle, he saw the poor animal's predicament and rescued it alive with its load. —*Transcript.*

Notices of Recent Patents.

Among the patents recently obtained through Dowsy & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CIGAR-TIP PROTECTOR.—Phenes Mish, S. F. No. 359,358. Dated March 15, 1887. This is an exterior envelope or tip made of a thin tissue of rubber fitted permanently to the end of the cigar, so as to leave the point exposed, and having openings or perforations made through the envelope, by virtue of which the sides of the cigar are moistened when it is placed in the mouth.

LUBRICANT.—John B. C. Barhanson, S. F. No. 359,418. Dated March 15, 1887. This is a chemical combination of certain ingredients, which makes a lubricant in the form of a liquid thin enough to be used in ordinary squirt cans, yet it holds plumbago in suspension and makes no deposit. The inventor states that in its use it does not run from the bearings, and has a tendency to cool them. It is economical in its preparation, and remains liquid at all times.

HOISTING-JACK.—David B. Scott, S. F., assignor of one-half to Joseph Gillenwaters, of same place. No. 359,405. Dated March 15, 1887. This invention relates to that class of hoisting or lifting-jacks on which a ratchet-faced lifting-bar, mounted and guided in a suitable stock, is operated by means of a lever and pawls engaging the ratchet-face of said bar; and the invention consists in the novel arrangement and construction of parts by which the bar is both raised and lowered, and by which the pawls are thrown into and out of engagement. This is a jack which is simple in construction but has great power, and is easy of operation.

WHEEL ATTACHMENT FOR BICYCLES.—James Brusis, Oakland. No. 359,126. Dated March 8, 1887. This attachment to bicycles consists in adjustable auxiliary wheels, located upon each side of the large wheel of the machine, and adapted by means of a lever on which they are mounted to be thrown down in contact with the ground, in order to support the machine in an upright position when at a standstill, and to be moved up again out of the way when the machine is traveling. The object of the attachment is to provide practical means for supporting the machine in an upright position when at a standstill in order to facilitate mounting and dismounting, and to provide for a rest when desired.

BOTTLE SAFE.—David Gtleson, S. F. No. 359,438. Dated March 15, 1887. This is a means for incasing and protecting bottles for transportation, and a means for allowing the bottle to be removed from its safe and protecting envelope for the purpose of washing, examining, cleaning or filling. Glass demijohns or bottles are, in order to be protected from breakage, often incased in woven wicker-work, and in some cases demijohns are incased in exterior wooden cases, the upper parts of which are open to obtain access to the mouth of the demijohn only; but in both these cases it is difficult or impossible to get at the interior to see if it is clean or discover flaws or streaks in the glass. This new invention is an exterior case having a hinged door, lock and handles, with a sliding removable bottom, chambered to receive the bottom of the demijohn, and a perforated top piece to receive the neck and guide it so that the whole may be slipped into or out of the safe when the door is opened. The inside of the safe has suitable elastic packing, part of it removable, and all fitted to the demijohn.

CROSSING FOR CABLE RAILWAYS.—Henry H. Lynch, S. F. No. 359,396. Dated March 15, 1887. This invention relates to an improved means for impelling the cars of one line of cable railway across another line which is running at an angle with the first, and in which case it is necessary for the car which crosses to temporarily let go its cable altogether. When two lines of cable railway cross each other it is necessary that one line of cable pass below the other crossing line, and when the car upon that line reaches the crossing the grip must be disengaged from the cable temporarily, the cable being depressed below that of the transverse line, and the car must be carried over the intervening space occupied by the transverse tracks either by a slight incline or by the momentum gathered before the grip is released from the cable. This cannot always be properly effected, as it sometimes happens that a team will cross in front of the car just at the time when it should have momentum sufficient to cross the transverse lines, and the car would have to be stopped at such a point that it would be necessary to push it across when it is again started. Mr. Lynch's invention consists of a friction wheel or roller driven by the movement of the main cable, and a means for bringing this wheel into contact with the foot-board or some other portion of the car, so that it will move the car across the required space by directly applied power.

A CONTRACT has been signed between the West Coast Land Company and the Pacific Bridge Company of San Francisco to build a bridge across the Salinas river, at Templeton, with three spans, each 110 feet, and iron piers, filled with concrete, to be completed May 21st.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO:

Saturday Morning, April 2, 1887.

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Business Announcements.

Bald Mountain Mining Co.—Forest City, Cal.
Hazelton Boilers—Pacific Iron Works.
Employment Agency—J. F. Crockett & Co.
Crystal Springs—St. Helena, Cal.

See Advertising Columns.

Passing Events.

The winter is now practically over, and already we hear of the prospectors being out in many localities. There is every probability of quite a "boom" in California quartz mines this year. Those who are lucky enough to find quartz ledges of any sort of value will have no difficulty in selling their property or getting their ores worked.

It is stated that a number of miners are going into the Yukon river country, in Alaska, this season. Some pretty big stories are told of the finds there last fall. No one, however, who is not well supplied with money, should venture so far away. The mining season is short, expenses are heavy, transportation difficult, and the country entirely unsettled.

The whole State is at present showing activity in railroad building and the building and improving of cities and towns. Large tracts of lands are being divided up and sold in smaller pieces to new settlers. This will be a very active year in California.

The Interstate Commerce bill goes into effect in a few days, and the people of this State and city are particularly anxious to learn exactly how it is going to work.

DR. ALBERT KELLOGG, the last surviving charter member of the California Academy of Sciences, and one of our best-known local botanists, is dangerously ill at his residence in Alameda.

Does Mining Pay?

The question here propounded is one that many papers in the East delight to ask and answer in the negative, some of them going so far as to aver that every dollar taken out in mining for the precious metals costs two dollars. That the business should, under these circumstances, have gotten on so well, is like many other seeming impossibilities, susceptible of explanation. The boy, going over a slippery road to school, finding that for every step forward he slipped back two, got there at last by turning round and going the other way. And so, we suppose, this business of mining has reached its present advanced position by going backward! The value of the precious metals mined in this country to date approximates two billion dollars. Whence came the other two billions that enabled our miners to make this production? From the country, we guess, where Cain got his wife! If it takes two dollars to get out one, how was the first dollar ever gotten out? As the origin of matter must remain one of the mysteries of creation, so must this remain one of the mysteries of mining!

The truth is, that mining for gold and silver, while it pays as a general thing, does not always do so, being in this respect like a great many other important industries—raising wheat and hogs, for instance. As a rule, these are found to be profitable, though they have their bad years, the trouble being sometimes local and sometimes general—now it is the markets, again the weather or the insect pests, or the swine take the cholera and die, if, to be sure, the thrifty hog farmer do not with the butcher-knife anticipate that event. Sometimes lack of success is due to bad management, sometimes to unfavorable conditions. Bad farming on good land and good farming on bad land alike result in failure. It is just so in mining, though success here is not dependent on such a great variety of causes as in most other industries. In mining, good management and good judgment are the things that win. With these, few losses or failures have occurred in the practical department of the business.

But the trouble with those who criticize this industry is their inability or indisposition to discriminate between the productive and the speculative branches of the business. In the latter, it must be admitted, there has been much money lost, just as there has been in grain, pork and oil deals. Just now there is a big wheat gamble on the tapis in Chicago, by which, however it results, somebody will lose heavily. But no one will think of charging these losses to the growers of that cereal. Millions are sunk every year by operators in petroleum, yet the odium of these losses is not cast upon the owners of the Pennsylvania oil wells. But when it comes to mining there seems to be everywhere a disposition to make it answerable for all the infamies practiced in its name.

To question the profitability of gold mining in California is preposterous. There has never been in all the past an industry that has paid like this. During the first 10 years of its history it added to the circulating medium of the world five hundred millions, enriching not only the miners, but the bankrupt and impoverished nations of all Christendom as well. And yet it received during that time comparatively little capital from abroad, the few money ventures made here having, as a general thing, proved fortunate to the investors.

With the inauguration of vein mining, owing to our inexperience and the inherent difficulties of the business, the losses attendant on its prosecution were for a time somewhat increased. But these difficulties have been so far conquered that gold mining in California ranks now among our most safe and profitable pursuits, if, indeed, it may not in this respect be said to take the lead of all others. Not only so, but the business is from this time on bound to improve rapidly; year by year it is destined to advance, gains being made in all its departments. As it has paid in the past, so will it continue to pay hereafter, nor is it easy to estimate its importance as a factor of productive wealth, or foresee the large place it is to occupy in the industrial system of the future.

The steamer Yukon made several trips from Juneau with miners to the Yukon country, Alaska, and a large amount of gold-dust is expected to be taken out there during the coming season.

Local Improvements.

The very marked increase in population in the Southern portion of this State of late, and the consequent increase in land values, had the natural effect of causing very marked improvement in the cities and towns. New hotels, new street railroads, hundreds of new residences and business houses, etc., have been built. Gradually the spirit of enterprise has spread until now there are few prominent towns in California that are not formulating plans for improvement. Of course in a city as large as San Francisco improvements are constantly going on unnoticed, which in smaller places would be loudly heralded. This city is rapidly growing and tracts which a few years since were bare are now being built up.

But in public improvements we have been laggards of late. In Golden Gate park alone some little advance has been made, but not at all commensurate with the importance of the place. The streets are mainly in bad order, and our general sewerage system is acknowledged by all to be behind the times.

By many all this is laid to the "dollar limit," under which we have been working for some years. But the real reason back of that is to be found in the fact that the people have not had confidence in the officials who have the spending of the tax money. Political bosses have had too much influence in appointments to forget confidence. As a result the dollar limit of taxation came into vogue, and public improvements of any magnitude could not be carried on.

A general disposition is now manifested, however, to do something toward beautifying the city, and putting it more on a par with other places of its size. Influential taxpayers have addressed the mayor on the subject, calling his attention to the necessity of a more liberal and extensive scale of public improvements. Information is desired from the mayor as to what should be done, the nature and extent of the improvements, their probable cost, the methods by which they are to be paid for, and the power of the municipality to enter into them. Among those things which are referred to are the probable cost of completing the City hall; the question of improvement of Golden Gate and Van Ness avenues; the practicability of making new and wide avenues as approaches to the park; the best method of repaving the streets; the condition of the sewers, and best means of remedying their defects; the improvements in Golden Gate park; the best means of repairing schoolhouses and providing additional accommodations; the question of ingrefting the kindergarten plan on the public school system, and that of providing public recreation grounds for children. The petition to which we refer concludes as follows: "We are of the opinion that the city should now enter upon a liberal and comprehensive policy with reference to these public improvements, and it is important that we should ascertain our situation in order to know what is necessary to be done, and in order to acquire the power necessary to do it."

The proposed plans, to which we have before referred, of making cable roads of some of the horse street-car lines, extending other cable roads, and building new ones, will be factors in the line of improvements. Then if any of the others are carried out in repaving streets, building schoolhouses, laying out recreation grounds, improving the park, rebuilding the sewers, finishing the City hall, etc., there will be plenty of work for all our laborers, mechanics, and workmen of all kinds.

It is pleasant to note these evidences of enterprise and progress. San Francisco, as the metropolis of the Pacific Coast, cannot afford longer to let her opportunities pass. She should keep the lead she has held so long, and let no spirit of parsimony cause her to stop in the advance. The wealthier taxpayers express their willingness to see more improvement, and the poorer ones will all be benefited. Our foundries, machine-shops and factories will all come in for a share, while the laboring classes will have plenty to do. The present mayor of the city seems to have the confidence of the community, which is fortunate at a time when the people themselves show a decided desire to advance public improvements.

An explosion by which 70 miners were killed occurred Wednesday in the Bulli colliery, Sydney, New South Wales,

The Late Incomers from the East Wax Sharp and Skeptical.

As many of the people now reaching California from the East come with a purpose different from that which actuated former arrivals from that quarter, it is to be expected that they will examine into matters and things here in a more careful and scrutinizing manner. A large portion of the present immigration come to buy land on speculation, or to settle and make their homes here; wherefore it behooves them to proceed with caution and avoid mistakes at the start. And this, it may be observed, they seem disposed to do, the most of them acting in a prudent and business-like manner. Instead of accepting statements in an off-hand way, as was once the case, they listen to what others have to say and then carefully inspect matters for themselves. Even the pleasure-seekers, tourists and such as come here for temporary enjoyment appear to be less credulous than formerly, discounting much that is told them about California in a way indicative of a skeptical state of mind.

Such being the case, it would be well for the old resident to hereafter avoid, in his descriptions of objects and events, undue amplification. He might perhaps find it expedient to even abate something from the weights, measurements and big figures by him heretofore adopted. If he cannot consent to reduce the size of the Big Trees, he might at least consent to their honest measurement by taking their girth a few feet above the ground, instead of down at its surface, where they have been abnormally enlarged by the exposure of the roots, through the washing away of the earth around them. Certain other data, generally accepted as sound, might, perhaps, in like manner suffer some change without serious detriment to the cause of truth.

From the above remark we, of course, except the sayings and traditions that relate to the mines, all, or nearly all, of which are well authenticated. When it comes to mammoth nuggets, big strikes, heroic deeds and blood-curdling adventures, as recorded of the mines and miners, we have no concessions to make; we shall continue to insist upon their being veritable facts, and this because we know they cannot be disproved. If we exaggerate the size of the *Sequoia Gigantea*, the matter-of-fact Eastern man may whip out his tape-line and by actual measurement convict us of lying. But he cannot catch us up in that way on these mining yarns, wherefore we are bound to stick to them, probable or improbable.

But, after all, we don't see why these, our Eastern visitors, should have so captious about what we Californians have to tell them, putting a literal construction on all we say and exacting proof of its correctness. It is in no such spirit we listen to their recitals. When the Boston man tells us about Bunker Hill monument, depicting in glowing terms its height, its symmetry and its vast proportions, do we question what he says? By no means; but hearing him through, exclaim, prodigious! sorrowing that California has no such pile, and wondering if there is elsewhere in the world anything like it! When the New Englander describes to us the sea serpent that makes his annual appearance off Nahant shoals, do we shrug the shoulder or exchange with each other the knowing wink? And when the Philadelphian grows enthusiastic over the old Liberty Bell, are we the people to cry out, "Yes, but the thing is badly cracked!"

Certainly not. On these and all like occasions we have shown ourselves to be patient, tolerant and polite, expressing a due degree of wonder at what has been told us, and indulging the well-affected laugh when it was intended to be humorous. Nor have we, while exercising so much good nature, ever sought, certainly not more than once or twice with any success, to palm off on these strangers a woolly horse or a live mermaid. Amenities like these should, we hold, meet with proper recognition and appreciation, despite the modicum of untruth and self-glorification practiced on both sides.

PLANS for the Stanford Memorial University, which have been entrusted by Senator Stanford to a Boston architect, are already in this city, and work will be commenced on the site chosen in a short time. The Eastern architect will superintend a portion of the University's construction, and home talent will be employed,

Interstate Commerce.

The topic of the hour is the probable working of the Interstate Commerce bill and its effect on local affairs. The importers do not like the high freight rates, but the local manufacturers and artisans do. Opinions, therefore, are apt to be biased by personal considerations. On the 4th inst. the bill goes into effect, and it will not be very long before we will be able to decide whether it is generally favorable or not to this city and coast.

The present outlook seems to be that San Francisco will be to a certain extent placed in the position she was before the railroad era. Her merchants and manufacturers will not have such sharp competition with Eastern centers, by reason of high railroad rates. This city can get goods by sailing vessels around the Horn in the old-time way, by the Panama steamers, or perhaps by the Canadian Pacific R. R. and connecting steamers. None of these routes are affected by the provisions of the Interstate Commerce bill.

It is claimed that the wine-makers, fruit-raisers and canners, and some other home producers, will be cut off from the Eastern markets by the new order of things. But many other branches of industry here, now languishing, will receive renewed impetus. The makers of boilers and engines, the foundrymen and machinists, and other branches of manufacture, will be benefited, since the high rates of through freight will keep out much Eastern competition.

It is well understood that the great extension of our railroad systems destroyed to a certain extent the geographical advantages of some cities. Great seaport and river cities have not the advantages as centers that they had before railroads became so general. But the provisions of this bill in a measure restore the previous conditions. If the roads must make certain charges for long hauls, and do only a retail, not a wholesale, business, so to speak, the seaport and river cities have a better chance as distributing points. It is hoped that, under the new conditions, San Francisco will regain some of her lost trade. That she will be called upon to supply a larger area than has been the case of late, is very probable. Certain classes of goods can come by sailing vessel very easily, and at greatly reduced cost. Heavier stocks will have to be carried, of course, for supplies will take longer to arrive than by rail.

It is pretty certain that high freight charges by rail will be of great benefit to certain classes of manufactures. It is probable, too, that other branches of manufacture can be established in California to more advantage than formerly. If this is the case, great benefits will result. Of course, the greatest good to the greatest number is to be wished for, and while some may suffer, others will gain. In a few months we will be better able to judge of the merits of the new law.

COAL IN SAN FRANCISCO.—As to coal in this market, a local circular says: A better feeling has been shown, and asking prices have been advanced materially, as foreign vessels cannot be induced to carry coal at the freight rates current last year, unless wheat-shippers do some forward chartering and at covering rates; for the moment nothing is being done for future, so that all foreign coal now loading must be well paid for. The last Australian mail adds a few new names to the list, and owners show no disposition to seek this port, preferring to take their chances for better outward freights at other ports, as the large amount of disengaged tonnage here and current rates discourage them. The present status of the coal market is particularly advantageous to our coast coal-producers, as they are getting full prices for their output and find ready sale for all they bring to market; they are further benefited by being able to secure carriers at low rates.

Foundry Notes.

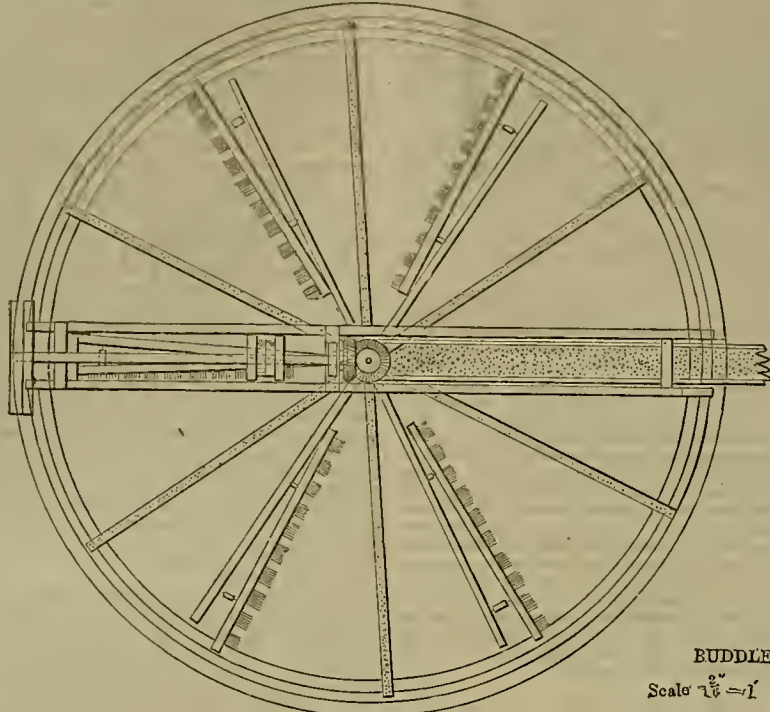
Seven of N. S. Keith's electrical motors are now being built, and are nearly completed, at the San Francisco Tool Co.'s works in this city. Two of these motors are to be used on the Folsom-street car line to run the cars by electricity.

The new Logan & Wisco machine-shops at Cottonwood, Shasta county, which have been in course of construction for the past four

will be stopped by the increased railroad freight, so that the shops on this coast will have more to do.

At the Union Iron Works a small steel steamer is being built for Yerrington & Smith, at Lake Tahoe. She will be used on the lake.

The Hammond Steel Manufacturing Company has in contemplation the establishing of two steel rolling mills—one in Oakland and the other at North Beach, this city. It is stated

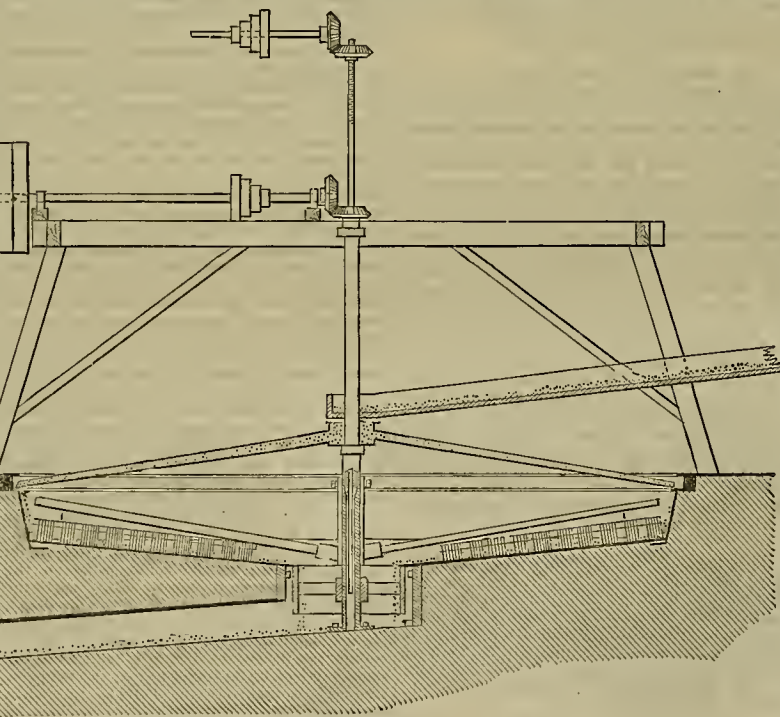


PLAN OF CONCENTRATING BUDDLE.

months, were started up this week. A foundry will also be run in connection with the shops. These are said to be the most complete works in Northern California. The purpose of the enterprise is mainly the manufacture of an im-

proved thrashing machine. It is said about 150 men will be given employment.

Four new locomotives are to be built at once at the Southern Pacific Company's Sacramento shops. Twenty-five caboose cars have just been finished, to take the place of the hothead cabooses. Forty first-class passenger cars are in course of construction. Four powerful locomotives, for use on the heavy grades in the Sierra, have just been completed.



BUDDLE FOR CONCENTRATING SULPHURETS.

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Local foundrymen are hopeful of benefit from the new Interstate Commerce bill. A great deal of Eastern machinery has been sent here of late and sold at low prices. It is thought that much of the shipments of this character

and machine-shop in Chihuahua, Mexico, where engine for mines, etc., and all necessary machinery can be built.

The issue of standard silver dollars from the mints during the week ended March 26th was \$432,387; during the corresponding week of last year the amount was \$439,496. The shipments of fractional silver coined since March let amounted to \$352,008.

The Navy Department is still seeking to ascertain the relative capacity of railroads and canals to transport torpedo boats and naval material from sea to inland waters.

Sewerage Systems.

It is an evidence of decided advance in sanitary reform to see many of our coast towns so earnestly preparing to improve their systems of sewerage. This is a subject which has received very little attention in the laying out of towns in California. No general systems have generally been adopted. In most cases, after the cess-pool period, private sewers have been constructed and afterward the general public sewers have had to conform, in a measure, to the private ones. In the many new towns being laid out in this State now, however, the sewerage systems are carefully considered. In the older ones, where improvements are going on, more care is being taken. The Board of Trustees of the city of San Diego have telegraphed to the noted sanitary engineer, Geo. E. Waring, Jr., to come and lay out their system of sewers, his compensation to be six per cent of the cost and his expenses. This shows that the city is bound to have the best it can have in the way of intelligent engineering advice. Los Angeles is moving in the matter of a sewerage system. San Bernardino citizens are to hold a special election for the issuance of bonds to build sewers. In this city prominent citizens have addressed the mayor and asked him the probable cost of putting all our sewers in good order and extending the system, if system it can be called.

All this is evidence of progress and enterprise. No town or city, whatever its climatic advantages, can be perfectly healthy with poor sewers. Some physicians assert that the condition of the sewers has nothing to do with the dreaded diphtheria, but facts and experience seem to disprove this statement. People who rent or buy houses in these days are apt to inquire closely into the condition of the sewers and the plumbing. In the city of San Francisco, under the new laws, the plumbers must be licensed, and must stand an examination before the license is granted. People want intelligent men to arrange the connection of these houses with the sewers. Now that public attention is turned to improving sewerage systems generally in all our towns, we ought to have more healthy homes than formerly.

A Concentrating Buddle.

In saving sulphurets, one of the old ways—and which is to some extent still practiced—was to use a common sluice with riffles, and then to further concentrate the material collected in the sluice by means of buddles. The accompanying cut shows a buddle which is used frequently and which is described in the State Mineralogist's last report. It is circular, with concave bottom, and the discharge for the tailings is in the center, where there is a hollow iron cylinder, shown in the cut, with its top or rim even with the bottom of the buddle. In this position, everything will flow out of the buddle, but this ring cylinder is attached to an upright spindle, and by the gear at the top is gradually raised, retaining in the buddle the sulphurets as they accumulate, and constantly raising the discharge of the tailings; the arms, also, from which the brushes hang, are gradually raised at the same time by the mechanism.

The material to be buddled is delivered from above the center through six pipes at the periphery of the buddle. Very little water is used, and there is no agitation except that made by the brushes, which are constantly moving around the circle, resting on the pulp, and being dragged around by the arms.

By means of the step pulleys above, the gradual raising of the discharge cylinder and of the brushes is regulated as required for the material operated on. When the buddle is full of sulphurets, it is stopped and cleaned out. This system of elutriation with riffle and buddle does very fair work if carefully attended to, but requires considerable labor and does not save the finest sulphurets.

A boy fell down a 60 foot shaft of an abandoned mine in Nevada county the other day, and was not at all hurt. A gentleman driving along the road heard his cries, and on investigation found the boy was at the bottom of the shaft. Young Landers, on being asked if he was hurt, answered, "No, but I'm hungry, and I want to get out of this hole." A rope was obtained and he was hauled out none the worse for his fall.

MECHANICAL PROGRESS.

A New Steel Improvement Process.

Improvements in the manufacture of iron and steel come so thick and fast upon us that it is with difficulty that we can keep the run of them. The latest thing in this direction is reported in the *American Manufacturer* as follows:

There is now in use at the steel works of Oliver Bros. & Phillips, Pittsburg, a process for the improvement of steel that is giving remarkable results. The process is the invention of Mr. David Brose, and its efficiency is only equaled by its simplicity and cheapness, the material used being very plentiful and no change of any kind in either plant or appliances being necessary in its use. In working, the "purifier," as the substance used is called, is introduced in the ladle immediately before the steel is run in. The steel is then poured into the ladle on the purifier, when a violent reaction occurs, setting free the contained gases, and causing a thorough agitation of the metal, with a resultant commingling of the metal and manganese far beyond anything attainable by a mere mechanical mixer. Not only is the steel thus rendered more uniform, but experience has proven that the ingots produced are remarkably free from blowholes. This is claimed to be a direct result of the violent ebullition, which, as before mentioned, takes place in the ladle. But the most valuable features of the process are, that by its use a good steel may be made with a greatly reduced quantity of manganese, and of an astonishing softness. With the aid of the purifier it has been found that steel of excellent quality can be produced with 30 to 40 per cent less manganese than is ordinarily required, and numbers of heats have been made with even less. In speaking of the improvement, Mr. Geo. W. Bryan, superintendent of the Oliver steel plant, said:

"The use of Mr. Brose's improvement is worth more than it costs us in the keeping of our ladles in order alone. Before we adopted it our ladles were a frequent source of delay, by becoming clogged up with slag, which was both expensive to remove and aggravating. But the arrangement of our plant was such that it could not well be avoided, but since the adoption of Mr. Brose's purifier this trouble has entirely disappeared. The slag is now very fluid and runs freely from the ladles, leaving them perfectly clean. Again, we can now run with about one-half the ferro-manganese we formerly required, at the same time producing a steel of a softness that is simply wonderful."

The process has been in use for several months now, and we expect to be able to give further details in the near future, when it has become fully protected.

A PERFECT WELD WITHOUT FIRE.—A correspondent of the *Blacksmith* writes as follows: "I have never seen anything in the columns of your paper relative to making a perfect weld of steel without fire or heat. A job came to my shop a few days ago in the shape of two pieces of three-quarter inch round steel, welded together end to end. A taper plug of steel was in one end of a shaft on which a corn burr was running. The plug of steel was bearing against a like piece of steel in the frame, the object of this being to tighten the burr. Owing to a loose box on the shaft, the shaft got to jumping, giving a side motion and creating friction enough to weld the two pieces of steel together as stated. The two pieces of steel were hardened."

[It is not a very uncommon thing for a steel spindle in a spinning mechanism, when running at great speed, as it does in a steel cup, with perhaps a little wobbling, to suddenly stop its motion and become thoroughly welded to the cup. Of course, this can occur only when the oil in the cup is exhausted.—EDS. PRESS.]

STEEL RAILS.—The railroad companies, says the *Philadelphia Record*, have found from experience that there is much difference in the quality of steel rails. The Chicago, Burlington & Quincy Railroad Company wants to buy 20,000 tons, but it wants the rails made of material in which there is 20 per cent of charcoal iron, and in addition it wants a five-year guarantee of the wearing quality, and it wants to decide for itself whether the rails fulfill the conditions required. The late Mr. Vanderbilt bought English rails and paid the tariff on them, because they would outwear the rails of American make. The steel mills of the country are turning out a better quality of rails, in consequence of larger experience. They find that they must have proper ores, and the Eastern mills are using large quantities of foreign ore in making their Bessemer pig.

THE HEATING POWER OF GAS.—A series of tests has recently been made by Dr. Fischer, the well-known German chemist, showing that in ordinary domestic stoves in use not more than 20 per cent of fuel consumed is really utilized for warming the rooms, whereas, with stoves burning gas, 80 per cent and more of the possible effect is obtained. In a sugar manufactory at Elsdorf, it is stated no steam engines have been used for several years. Gas is made at a cost of about 10d. per 1000 cubic

feet, and it is used for lighting and driving gas engines. At the Essen Works water gas is made at a cost of 4d. to 8d. per 1000 feet, and serves both for fire and lighting.

ELECTRICITY FROM BELTS.—Once in awhile an iron saw table will get charged with electricity to such an extent that it is unpleasant to work at it. Sparks six inches long don't feel very pleasant to the knuckles, or, when stooping down, to the face. The electricity is probably caused by friction of the belt, and it is easy usually to carry it off by connecting the bench with the water pipes by means of a wire. In shops where they don't have water pipes the wires may be connected with the steam pipes, or run into the wheelplet of water. Anything that will carry off the current as fast as produced will do the business, and if so desired, it may be taken direct from the belt by putting a wire close to it, said wire carrying a dozen or two sharp points within two inches of the belt. Some overhead belts need to be fitted with these conductors, and we have seen sufficient current thus gathered to run 16-candle power incandescent lamp. It was not, however, a very good light, for the current was very variable and unreliable.

LARGE OR SMALL BOILERS.—Mechanical engineers are taking greater interest in large boilers than ever before, remarked an engineer the other day. "They see points of advantage in placing, say, a 320-horse power boiler in a shop in preference to, say, four 80-horse power boilers. First, there is a saving in heat, since the loss by radiation from the walls of a 320-horse power boiler is only slightly greater than from the walls of an 80-horse power. Then, again, there is a saving in firemen's wages, for one man generally attends to a boiler, however large it may be. Furthermore, there is a saving in firing, through less frequent disturbance of steady and economical combustion; there are only about half the number of doors to be opened for the passage of cold air while replenishing the fire. The accepted practice now is to use large boilers for driving the machinery, and generally for all other purposes where more than one boiler is needed."

POWER FROM SHAFTING.—A firm which makes a specialty of the erection of shafting, states that its experience teaches that the loss of power due to improper conditions in the line shafting amounts to 50 per cent of the engine power employed, and that the defects most commonly found are as follows: shafting too light for the duty, crooked shafting, hangers too far apart, hanger bearings too short, pulleys too heavy and not properly balanced, hangers which are not adjustable and not self-adjusting, and sometimes filled with spurious habbit metal, and improper proportion between two pulleys connected by the same belt.

THE WORKSHOP OF THE WORLD.—The fact that England is the workshop of the world can only be appreciated by a ride through it and by the thousands and tens of thousands of factories which one sees by a trip across it in any direction. There are about five persons there engaged in manufacturing to one engaged in agriculture. The statement is made that all the varied machinery of Great Britain now operated by steam-power is capable of performing more work, and hence producing more products, than could be produced by the labor of 400,000,000 able-bodied men—a greater number than all the able-bodied men on earth!

A NEW IRON REFINING PROCESS has been reported at St. Louis. It is a pneumatic process, as yet only in its experimental state; but a practical experiment is soon to be made in that city. It is claimed that by this process the quality of wrought iron can be enhanced 40 per cent. The principle is comparatively simple. The raw material is first acted on in an ordinary Bessemer converter, but before the recarbonizing process is completed, it is transferred to a revolving reverberatory furnace.

POSITION OF SAWS.—Many improvements have been made in the hand-saw, but one has just come to light by a millman who must have noticed how the hand-saw is held in the hand of the joiner; it is always leaned forward as it cuts easier, runs smoother, and can be kept on the line without any trouble. The hand-saw is made to do likewise by tilting the whole frame in a forward direction.

IN THE MACHINE-SHOP old methods of work and procedure must not be retained from an excess of conservative sentiment, when it is obvious that they have been superseded by improvements, and machinery must not be retained in work, though intrinsically in good condition, when mechanical invention has rendered it virtually obsolete.

LOAD FOR WIRE ROPES.—A proper safe working load for wire ropes is as follows: One-half inch in diameter, 1000 pounds; five-eighths rope, 1500 pounds; three-fourths rope, 3500 pounds; one-inch rope, 6000 pounds. This is for 19 wires to the strand, hemp centers.

WEAR AND TEAR OF LOCOMOTIVES.—Mr. Webb, of the London & Northwestern Railway, England, stated in a recent speech in London that a new locomotive is placed on that road on the average every five days to repair the loss caused by ordinary depreciation.

SCIENTIFIC PROGRESS.

The Explosion of Meteorites and Cause of Thunder.

M. Hirn has communicated a lengthy paper to *L'Astronomie* in which he discusses the various phenomena accompanying the explosion of meteorites, and incidentally the cause of thunder. We give below a brief synopsis of this interesting paper from a late number of *Nature*:

M. Daubree, a long time ago, pointed out how very striking and difficult of explanation the noises are which are often heard in connection with the passage of meteorites, and called in question the explanation which had been given of their being really due to a veritable explosion.

M. Hirn, in his paper, begins by considering the causes which are at work in the production of the thunder which accompanies electric discharges, and of this he writes as follows: "The sound which we call thunder is due, as everybody knows, to the fact that the air traversed by an electric spark, that is, a flash of lightning, is suddenly raised to a very high temperature, and has its volume, moreover, considerably increased. The column of gas thus suddenly heated and expanded is sometimes several miles long; as the duration of the flash is not even a millionth of a second, it follows that the noise bursts forth at once from the whole column; but for an observer in any one place it commences where the lightning is at the least distance. In precise terms, the beginning of the thunderclap gives us the minimum distance of the lightning; and the length of the thunderclap gives us the length of the column. It must be remarked that when a flash of lightning strikes the ground, it is not necessarily from the place struck that the first noise is heard." M. Hirn then gives an interesting case which proves the truth of this remark.

He next points out that a bullet whistles in traversing the air, so that we can to a certain extent follow its flight. The same thing happens with a falling meteorite just before striking the earth. The noise actually heard has been compared to the flight of wild geese or the sound produced when one tears linen. It is due to the fact that the air rapidly pushed on one side in front of the projectile, whether bullet or meteorite, quickly rushes back to fill the gap left in the rear.

The most rapid cannon shots scarcely attain a velocity of 600 meters a second (over 1500 miles per hour), while meteorites penetrate the air with a velocity of 40,000 or even 60,000 meters per second; and this increased velocity gives rise to phenomena which, although insignificant where cannon shots are in question, become very intense and important when we consider the case of the meteorite. With that velocity the air is at once raised to a temperature of from 4000° to 6000° C. The matter on the surface of the meteorite will be torn away by the violence of the gaseous friction produced, and will be vaporized at the same time by the heat. This is undoubtedly the origin of the smoke which meteorites leave trailing behind them.

We have, then, precisely as in the case of lightning, a long, narrow column of air, which is expanded, not so instantaneously, certainly, as by lightning, but at all events in an extremely short time and through a great length. Under these circumstances we should have an explosion in one case as in the other—a clap of thunder followed by a rolling noise more or less prolonged. If a cannon-ball could have imparted to it a velocity of 100,000 meters per second (nearly 250,000 miles per hour), it would no longer whistle—it would thunder, and at the same time it would produce a flash, as of lightning, and would be instantly burnt up. M. Hirn depends upon this line of reasoning to show that meteoric thunder need not necessarily have anything to do with an actual explosion. He then points out that the intensity of the noise produced in every point of its trajectory depends, first, on the height; second, on the velocity of the meteorite; third, on its size; and fourth, on the configuration of the country over which it passes. He refers to the observation of Saussure that a pistol fired at a height of 5000 meters makes very little noise. He then points out that at a height of 100,000 meters the density of the air is reduced to the small value of 0.000,000,004 kgr.; the temperature being supposed to be 200° C. In such a medium as this a meteorite could produce no sound, although it might give out a very brilliant light, because its temperature and light depend, not on the absolute value, but on the rapid change of density.

HOW STEEL IS CONSTRUCTED.—Some important researches into the inner structure of cast steel were recently made by Messrs. Osmond and Worth at the Creusot Iron Works, France. From the steel a plate was rolled as thin as possible and then put on a pane of glass. Next it was treated with nitric acid, whereby the iron was dissolved, leaving the carbon in the condition it occupied in the iron. When this skeleton was examined with the microscope it was discovered that the carbon is not at all distributed evenly throughout the mass, but that the steel consists in its inner structure of tiny particles of soft iron inclosed in cells formed by the carbon. These cells are again distributed in the iron, either combined or as a collection of cells, having considerable open spaces between them, so that such a plate or sheet of

steel may be rolled until it becomes transparent. These spaces are irregular in shape, and may in the raw material be almost noticeable; but they are reduced in proportion to the treatment to which the steel is subjected, either by rolling or hammering, as naturally the homogeneity is increased.

PHOSPHORESCENT BIRDS.—A correspondent of the *Scientific American* relates the following: "In reading of the habits of the wading birds, and particularly of the crane, I do not find that naturalists give any account of their manner of attracting their prey at night. My attention was called to the matter while gigging for fish, by frequently observing dim phosphoric lights appear and disappear along the shore like jack o'lanterns, which I for a long time supposed them to be. On one occasion I fired at such a light, and brought down a large blue crane, on which the phosphoric spots were clearly visible after death. There are two such spots, the larger being high up on the breast and the smaller at the bottom of the breast bone, the bird having power to reveal and conceal them at will. I have since stuffed many of the water walkers, and find that all have the same general arrangement of the feathers, and, as I believe, the same power of lighting up the water to attract the fish. Will some naturalist who is posted on this subject please throw some further light upon it for the benefit of science?"

RING-SHAPED ATOMS.—Among the most interesting results of recent chemical investigation must rank our recognition of the fact that there exist certain so-called "ring-shaped" groups of atoms, like those of benzol, naphthalene, anthracene, and pyridine, which are widely distributed, and which are formed with exceptional readiness. Among these, according to two German investigators, a peculiar interest attaches to that ring which exists in anthracene, and which is characterized by having two phenylene groups connected by two groups of atoms, which, in the benzol residues, take up the ortho position to each other, so that with the carbon atoms in question they form a third ring of six members. Two compounds analogous to anthracene and acridine have been investigated in the Heidelberg Laboratory. These compounds, like anthracene, produce beautiful coloring matters. These observations have suggested that further investigation should be made in the same directions with a view to the production of other economic values.

INCENDIARY BIRDS.—Incendiarism is a new charge to bring against any member of the feathered tribe, but this is what a *Scientific American* correspondent says of the mischievous little English sparrow which has become so thoroughly at home in this country: "I write to relate an incident which may be of interest to some of the readers of your valuable paper. There is a bar-iron mill, situated in a neighboring town four miles from here, that has been on fire three or four times, in which the English sparrow might be called the incendiary. These sparrows pick up old pieces of cotton waste, which they build in their nests among the timbers of the roof of the mill, and in every case of the fires above mentioned these nests were the cause, either from spontaneous combustion or from sparks from the hot iron striking and lodging in the nest. If you could suggest some way of getting rid of the sparrows, I think the manager of the mill would be glad to adopt your plan."

FRUIT DEVELOPMENT.—The cause of the increased fertility in the limbs of fruit trees, where the limbs are bent to an acute angle, has recently been investigated by Prof. Soraner. He finds that the bark on the lower surface of the twig, below the bend, is thrown into transverse folds, here and there detached from the wood. New woody tissue is formed in the cavities produced by such folds, which is filled with starch grains, and after this there is a formation of a new woody tissue of a normal character, but always thicker there than elsewhere, and especially on the upper curve of surface. This mass of woody tissue checks the flow of water toward the tip of the branch, to the great advantage of the bud directly beneath, which is thus more likely to develop as a fruit bud.

THE CAUSES OF PAPER TURNING YELLOW.—Prof. Wiesner says that the yellowing of paper is due to an oxidation determined by light, and especially by the more refrangible rays. This discoloration is more striking in wood papers than in rag papers. Dry air is another important condition for the preservation of paper. The author thinks that in libraries the electric light is inferior to gas, on account of the large proportion of the more refrangible rays present in the former.

PLANTS AND ANIMALS.—Out of more than 120,000 species of plants known to botanists only about 250 have been put to use by man; yet this proportion is much greater than in the animal world, from which only some 200 species have been selected, while the animal kingdom reckons millions of species.

ALUMINIUM GUNS.—"Aluminium would make a good gun on account of its strength, and at its present cost the Government could afford to pay the price for it and make more durable guns than have ever been manufactured," says Colonel Roberts, of Pittsburg.

Lexington.

The New Ventura County Mining Camp.

The camp is becoming lively, and prospectors are arriving every day. Some snow is left, but you can't come here with a wagon for 10 days yet. Walking is good if you want to tackle it.

R. B. Harper, a well-known mining expert, second to none in the State, has been here for the past week in the interest of a strong company. Capitalists are awaiting his decision eagerly. He has purchased the Esperanza mine, and is negotiating for another. He will leave for San Francisco in a day or two to purchase a stamp mill and hoisting works.

The Esperanza carries free-milling ore which assays \$65 or \$70 per ton. One mine in camp is sulfiteated to have a lively camp. Lots of country is not yet located. There is a good chance for a tenderfoot or anybody else. The Brown mine, owned by Menzies, Wilhoit & Bibb, has a ledge traceable for three locations. There is a 75-foot tunnel. The face is full of rich free-milling ore. There is a 68-foot shaft. The ledge stripped for 1500 feet. One thousand tons of ore are on the dump. The same parties own the Golconda, a 30-foot vein of silver and gold, with a 150-foot tunnel. The General Lee, silver and gold, has a 75-foot tunnel. The Double Standard is on a 3-foot ledge of rich ore which assays "way up." Smith & Grover have five locations, with millsite adjacent to all. The Exchange is on a 42-foot ledge, with a 9-foot vein of gray copper ore running \$4.25 per ton in a 10-foot shaft. There is also a 160-foot tunnel, with a 60-foot shaft at the head that contains a 5-foot vein of iron sulphurets running high in gold. The Matchless is on a 9-foot vein, running \$42 in gold. The Carbonate Prince has a 4-foot ledge and nine smaller ones in 400 feet. The Carbonate Queen is on a vein of carbonate ore, very rich. The Carbonate King has three pay streaks; the first, a green, bromide vein of 13 inches; the second, a vein of lead carbonates, 18 inches wide; the third, a 9-foot pay streak rich in gold and silver. The Castac mine is owned by Hall & Frazier. A 7-stamp mill is now running. There are 800 tons of ore on the dump and it is a very rich mine. Capt. Kelle and Capt. More have a very rich prospect with a 20-foot tunnel. William Aram has several ledges assaying from \$8 to \$150 in gold and silver. DeMoss Bowers has a rich prospect in the Annie and Silver King claims. Placer mining is averaging \$5 per day for each man. Stores, a restaurant, grocery, etc., will soon be erected.—*Los Angeles Times*.

THE PLACER MINERS.—It is evident that some of the miners about Georgetown, and perhaps in some other parts of the county, are hostile to the movement toward securing immigration and the settlement of the county, as they fear that titles will be obtained to the land and their prospecting privileges will thus be curtailed. They look at this in a wrong light, however, and from a very impractical standpoint. We are just as strongly opposed as they are to land-grabbers getting titles to mineral land, under a pretense that it is agricultural; but the right way to oppose this is not to insist that the land in El Dorado county is of little or no value, except for mining. Such a theory cannot be maintained. It is admitted by all that the palmy days of placer mining are over. There is considerable to be done yet, and there will probably be new mines discovered here and there, by which the industry will be kept alive for many years; but the mining future of the county must be looked for in quartz and deep gravel mines, instead of the more easily discovered placers. The right way is for our miners to obtain patents to such land as they are willing to pay for as mineral, and then they can prospect without interference. If the land is not worth paying for under the liberal rates allowed by the Government, it is certainly not very valuable for any purpose whatever. One thing they should regard as inevitable: The lands will be taken, either for mining or agriculture, and they have but little time to lose. Sooner or later railroads will be built and people will come in to make homes. We have no wish to belittle mining nor to say one word in opposition to the very natural desire which miners have to continue their industry, but we state what all will acknowledge to be facts, when we say that if they wish to mine, they must soon obtain patents to the land.—*El Dorado Republican*.

A PERFECT MARBLE.—As was predicted from the beginning, the more the Lugo marble quarry is developed, the stone is found to be of finer quality. A correspondent writing from the quarry says: "The seams are as straight as a line and run perfectly parallel. The upper layer is about 20 feet thick; the second 3½ feet thick. The third layer has been uncovered but not cut through, and its thickness is not yet known; it may be 3 feet thick, or it may be 20 or more. One thing is certain, it is a solid layer and in its original place in the formation. There has never been on the market a better marble than that we have here, if it was ever equalled; or a quarry that will compare with this in its possibilities. The Vermont and Italian are good marbles, but are not to be compared to this in color, durability, purity of composition or strength." The new mill is working well and is rapidly sawing out marble for the market, all of which is taken as fast as offered.—*Inyo Independent*.

USEFUL INFORMATION.

Unsound Manufactures.

One of the crying evils of the times, and one which is working great damage to our producers of whatever character for both our home and foreign markets, is the inclination to place cheap goods on the market, and in doing so the limit of true economy and prudence is left far behind. The clothing which the great majority of people buy is poor stuff. It looks well at first, but soon fades, comes to pieces, or wears out. It takes about three suits to do the legitimate service of one good one. A large amount of shabby gentility, so far as appearances go, is the consequence, and it contrasts unfavorably with the stout and appropriate garments used by the masses in Europe or by the people of a generation ago anywhere.

The unsound manufacture also extends to wagons, agricultural implements, furniture and many other articles in common use. The frequent remark is that it is difficult to find any of these things which are up to the old standard of excellence. A lack of confidence in chairs is experienced by heavy people which did not exist some years ago, and good old housewives mournfully shake their heads at the degeneration of fabrics in which they are interested.

In California this disposition is mainly manifested in cheap dwellings and unfair fruit-packing. A lot of raisins packed in one of the interior counties was recently found with good layers at the top and bottom, with a middle layer of perfectly useless or rotten raisins. Fruit frequently comes to this market fair upon the top but very inferior below. Such things tend greatly to the injury of trade, and should be sought out and exposed wherever possible.

Much of this imperfection in manufactured articles is attributed to the increased use of machinery, but as machinery is not responsible for the kind of material used, the reason is not adequate. The truth is that there has been a wave toward flimsiness and apparent cheapness in houses, clothes, and pretty much everything else, but there is a fair hope that it has about reached its limit, and that, under the influence of prevailing experiences, the current will soon set the other way, as it has already done in some particulars.

Saving Wool Waste.

Woven and other wool waste has long been worked up and utilized by means of a machine similar in principle to the ordinary wool-carding machine; but there are certain portions of such waste, sometimes known as "hard-end wool stock," "hard-twisted yarn," as yarn or in the shape of woven and especially worsted goods, which the ordinary machine employed in disintegrating such stock will not properly work up. To meet this deficiency, a Mr. Garnett, of England, some time since invented a machine which bears his name, and which does good work. This is a comparatively new machine, but it is becoming an indispensable adjunct in the manufacture of woolen goods in English mills, and is destined to have a more prominent place in American mills. The machines are made similar in principle to the common wool-carding engine, but everything about them is more rigid and of heavier material.

As already said, the invention is an English one, but it is also made in the United States by a Philadelphia concern, and in every way equal to its English prototype. The invention has been a boon to the woolen-manufacturing industry by allowing the putting of hard-twisted yarns into a condition suitable for the finest manipulation on the carding engine. The Philadelphia concern has added some improvements to the Garnett machine, and by certain carding attachments the stock is delivered in a more perfect condition than before. The first machine of this kind has been recently set up in a Connecticut mill, much to the cation of the users.

Journals and Bearings.

When allowance for oil space is made, says a contemporary, the fitting should be as carefully made as though the one surface was to be driven on the other—that is, the bearing should be cylindrical as well as the journal. The surface should be fitted up with a scraper, where the bearings are large, and brought to a uniform fit. Fitting so that the journal is a true cylinder, while the bearing is bored a double cone-shape, or elliptical in cross-section, would never do. The journal would press through the oil at the high place on the small parts of the cone, and there would be abrasion. But by the use of a scraper or file, or both, after the lathe work is done, the bearing and journal may be brought to a near fit, so that the needed film of oil will have a uniformity of thickness along any line lengthwise, and he but slightly crescent-shaped, with true circle outlines in cross-sections through the bearings. Such a bearing will be expected to run cool, while the bearings, which "will soon wear to fit," will not run cool. In the latter, a cool bearing seems never to be possible, because at first wear is expected in place of scraping, to reduce the points to be worn off, and such wear requires contact of bearing and journal. That contact will injure the journal, making it rough, which in turn will cut the bearing rudely. Now, by the time some degree of evenness is imposed to

be gained there will be too much space for the oil. The shaft will then tumble about, knocking against the bearing with such force as to cause metal contact and rubbing. Both of these actions produce heat as well as continue in aggravation the cause of that heat. In short, in order that machinery bearings and journals shall be correct, they must be made right. The "wear to fit" is utterly out of the question in first-class work; that is to say, fine journals and bearings do not grow like weeds, but must be the result of skill and good judgment as well as other things.

IMPROVEMENTS IN LEATHER DRESSING.—Various ingenious and important improvements have within the last few years been introduced into the process of leather dressing. The old-fashioned "splitting" machines have been greatly improved, and a new kind of machine, known as the "band knife," has been introduced with marked success. Hand labor has, moreover, been largely superseded by various machines of ingenious construction having that end in view.

PATENT LEATHER is coming into fashion again for men's and women's fine shoes. Some 15 or 16 years ago, balmorals, in fancy foxing and patent heel pieces, were largely worn by women, and there is every probability of a good many being made this season. Gentlemen are wearing patent tops for street wear with double soles, as the ordinary polished grain dulls under the overshoe and destroys the dressy appearance accessory in making oaks.

SHOE PEGS were invented in 1818 by Joseph Walker, of Hopkinton, Mass., but, as usual, the honor is claimed by others as well. Hard maple and birch is much used, the latter being the favorite, the chief object being to get some hard, close-grained variety of wood which splits easily. Germany imports large amounts of shoe pegs from the United States.

BOILER FLUES.—A correspondent of the *Stationary Engineer* asks, "Why must the flues in a horizontal boiler be covered with water, and the flues in an 'upright' be partly exposed to the heat?" The *Engineer* does not answer the question.

A FEW oyster shells, mixed with the coal used for a furnace or large stove, will effectually prevent the accumulation of clinkers.

A POWERFUL PUNCH.—A punch has just been made that will punch six holes at one time through one-inch thick splices.

SIXTY-FIVE varieties of lettuce are known to horticulturists.

GOOD HEALTH.

How to Promote Health.

After all that has been stated of the effects of the atmosphere in high altitudes or at the level of the sea, the influence of forests and ocean, of sea coasts and interior places, humidity and dryness, cold and heat, the winds, electricity and ozone, and no matter what of other conditions, the paramount considerations for the promotion of health are an abundance of pure air and sunshine and outdoor exercise. Without these, no climate is promotive of health or propitious for the cure of disease; and with them, it is safe to say, the human powers of accommodation are such that it is difficult to distinguish the peculiarities of any climate by their joint results on the health and longevity of its subjects.—*Bell's "Climatology."*

The above is well and truly said, and the most important of the three requisites enumerated is "outdoor exercise." Going to the springs, going to the seaside, or going to the mountains is all good for invalids; but going into the garden in any reasonable kind of a climate and working in the ground with the hoe or spade moderately, but with sufficient outlay of strength to produce a reasonable degree of perspiration, for one, two or three hours daily, will do more to promote health than either medicine, springs, seaside, or mountain. We have tried it and know of what we write. We have witnessed the beneficial effects of moderate exercise of that kind—work—in others, and we know that it is of more value and infinite less cost than the best mineral springs that ever existed. The great trouble with by far the large majority of invalids is lack of exercise of the right kind—of work that will make the sweat start and flow freely for one or two hours daily.

The writer once left San Francisco and spent nine months in traveling, and came back but little better than when he went away. He then put on a suit of old clothes, took a hand trowel, got down upon his knees, and dug in his garden, in this city, three or four hours a day, and in six weeks completely regained his health.

Another instance: A young man left London, England, a few years ago, and spent one year in traveling, reaching this city in the spring of the year, but little better than when he started. Having been told of our own experience, he went up to Haldsburg, in this State, went on to a ranch and commenced work, when he was not able to use the hoe or spade more than two hours out of the 24; but he persevered, and in less than six weeks he was able to

do a fair day's work. He returned to this city a well man, and went directly to London. He dug his health out of California soil. Thousands of invalids might do the same thing if they would; but to most invalids it is hard medicine to take, and they neglect it, oftentimes to become confirmed invalids, or to meet an untimely death. Exercise—not with dumb-bells, or in any way in the gymnasium, but in the open air, in the form of work, turning up the soil, is the best promoter of health that can be devised.

Good Health Talk.

In ancient as well as modern times, that class of people who disregarded the laws of health have rapidly degenerated into the grossest sensuality and intemperance. Intemperance in all its forms has especially marked their path. Pagans who despised the body came in upon our ancestors like a flood of corruption. Our disregard of the laws of health is not of Christian or Jewish origin. The Christian religion adds to the length and vigor of life, because it requires a rigid adherence to the divine law for the body; hence it is sanative and curative, tending to long and satisfactory life. Look at the hosts of God entering Canaan with not a feeble one among them, an army without hospital or ambulance. This was the God-decreed natural consequence of their obedience to the Jewish sanitary law which makes such full provision for health. It was no mysterious providence, no arbitrary reward, but the simple operations of laws which are as good to-day as then, and in the keeping of them there is the same recompense.

Do you think it matters only to whimsical people whether the hour for retiring be early or late? Whether the food be easy or difficult of digestion? A deaconess at a church Thanksgiving dinner said: "Mince pie and cheese always make me sick, but I like them and I will eat them sometimes." She had had surgical treatment for a disease which was directly aggravated if not excited by such food.

The family table stands in the inner court of the home temple. Priest and priestess should guard the integrity of its supplies. One of the headwinds of intemperance is unwholesome and insufficient diet. Men try to supply in drink what is lacking in their food. Especially to be condemned is the sinful practice of pepperiag food for children. Leave pepper and hot sauces for the palate that has become calloused by abuse, but respect the delicacy of child taste. Many a boy goes from his mother's table with the taste for strong drink already formed by what he found in the castor. Another important tributary to the stream of intemperance is the late bedtime of children; even the babies are kept up and dressed during the evening if their mothers have callers. This cultivates a love of excitement, the most subtle of stimulants from the cradle. The child associates gaslight with a good time, and loses the best hours for sleep, thus interfering with healthy growth. Nothing can more completely subvert our efforts for temperance than the social customs which cut short the hours of sleep. The child is injured for life by such customs, and the young man who dances until one o'clock feels the need of "something" to take the place of three hours of sleep.—*Ventura Free Press*.

PREVENTIVE MEDICINE.—Dr. C. R. Illingworth thus writes in the *Med. Press*: "One of our great aims as physicians is to prevent disease; another is to cut short its course when developed. Our power in these directions finds full scope among that class of disorders now generally recognized as depending upon the reception, growth, and development in the tissues of micro-organic life in one shape or another. By the continual suppression of the growth and development of these forms of cell life, we may, indeed, hope at length to erase the names of the diseases they cause from the category of those 'ills that flesh is heir to.' The diseases I refer to are scarlet fever, diphtheria, measles, whooping cough, rheumatic fever, chicken-pox, small-pox, syphilis, hydrophobia, yellow fever, *et hoc genus omne*."

THE TELEPHONE AS A SOURCE OF INFECTION.—At a meeting of the Caucasian Medical Society, Dr. A. P. Astvatzaturoff, of Tiflis, drew attention ("Proceedings of the Caucasian Medical Society," November 17, 1886, p. 263) to the danger of infection arising from the promiscuous use of the mouthpieces of public telephones. To prevent any accident of the kind, he recommends that the mouthpiece should be disinfected every time after, or, still better, before it is used. In other words, some disinfectant fluid should be kept at every telephone station, and the speaker should, first of all, dip the mouthpiece in the fluid and then wipe it with a clean towel.—*Brit. Med. Jour.*

EVILS OF OVEREATING.—Sir Henry Thompson thinks that more than half the diseases embittering life are due to errors in diet, and that the mischief done in the form of shortened life is greater from indiscriminate eating than from the use of alcoholic drink. An over-supply of nutrition, which must go somewhere, produces liver disease, gout, rheumatism, and various other disorders. To eat too much is a blunder, and to wash down nutritious food with nutritious drink is one of the greatest dietary indiscretions that can be indulged in, especially for persons of sedentary habits.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

KENNEDY.—*Ledger*, March 26: This mine is being put in good working condition as fast as possible. Work has been started on the north shaft, with the intention of making connection with the old works at the 600-foot level. This shaft is now 400 feet deep. When connected it will be of great service in the way of ventilation. It will be continued to the deeper levels as soon as possible. The mine is in a fairly prosperous condition. The ore is low grade, but reaches the paying standard, and by getting the property in a thoroughly equipped condition for efficient working, the owners expect to realize a small but steady profit. The mill crushes about 90 tons per day. The mine and mill give employment to 75 or 80 men.

MADDERN MINE.—J. B. Gluyas, a mining expert, gives the following report of a recent visit to this mine: The Madden mine is situated about seven miles east of the town of Jackson, Amador county, and about one and one-half miles from the Amador canal tunnel. Mr. Madden intends to run a tunnel at or about 200 feet above the level of the canal mentioned above, which would give 500 feet of backs. There is an excellent millsite just below said canal, where sufficient water for all milling purposes can be had.

MISCELLANEOUS.—New grizzlies are to be placed in the Kennedy mill at once. H. G. Murray has the job of putting them in, and the work will take two or three weeks to accomplish. Knight & Co. have the contract for putting in another steam derrick at the Arroyo Seco gravel mine, near Irish hill, Lone valley. The one in use, and built, and indeed invented by the same firm, has given excellent satisfaction. It has enabled the company to work the claim profitably, when the outlook previously was exceedingly dubious. A roller quartz mill is to be erected on the Goodman mine at Quartz mountain. In running a tunnel into the mountain some rock of a richer character than has heretofore been encountered in this huge mountain of quartz, has been struck, and the prospects are favorable for a busy little mining camp springing up in this vicinity. The shaft of the New London has reached a depth of 800 feet. The intention is to go 200 feet deeper, before commencing to drift. M. M. Culbert's quartz claim on Rancheria creek is turning out better than the first cleanup indicated. It is almost invariably the case that the first cleanup in a new mill does not come up to expectations. It takes experience to understand how to run any new mill with strange ore so as to obtain the best results. The Culbert 10-stamp mill is doing fairly well and strong hopes are indulged that the property will prove a remunerative one after all. The two-stamp mill of Harris & Co., near Stony creek, a couple of miles west of Jackson, is doing nobly. The last run yielded \$900, we are informed, which would give from \$8 to \$10 per ton. This leaves a snug profit after paying all expenses.

Butte.

WEST BRANCH.—*Oroville Register*, March 24: W. M. Pentz, E. C. Chase, Harry Paul and Frank Davis are running a new tunnel on Conklin ravine to develop a mine which they believe to be rich. Austin Parish and Ed Wilson have good pay gravel in their claim near Parish's place on the ridge above Pentz. The Cape Horn claim, or the George Henderson & Co.'s claim, has been bonded, and work is being pushed ahead on the tunnel, which is now in a distance of 300 feet. The Portuguese claim adjoining the Henderson mine has also been bonded, and a new tunnel is to be run upon that. The Blue Hawk mine in this same neighborhood has lately been sold and the owners have struck good pay gravel.

Calaveras.

AT ANGELS.—*County Record*, March 23: No new developments have been made in our mines during the past week. The cleanup at the Matson mill (5 stamps) yielded handsomely, the result being, we are informed, \$900. The cleanup at the Osborn mill last Tuesday was very satisfactory, indeed. A five days' run was made, crushing about 25 tons of ore. The rock is from the Glass and Dieren mine, and yields about \$14.40 per ton. The bullion received at the recent cleanup is estimated at about \$360.

El Dorado.

CRUSHING OF ORE.—*Georgetown Gazette*, March 26: Dr. Spencer is making ready to get out another crushing of ore from his mine to be worked in the Eureka mill. These occasional crushings furnish the doctor with the sinew to drive ahead his tunnel, which is the neatest and best tunnel we have seen in this district. He is now raising an air shaft.

MILL.—*Placerville Observer*, March 29: J. J. Wonderly has returned from the El Dorado mine, situated one-half mile below the Springfield, and reports that the mill which has been under course of construction for weeks past is completed, and that operations will commence on or about the 1st. Much is expected of this mine, and the operators thereof are firm in their belief that it will develop into as good a paying mine as there is in the county.

Inyo.

BIG LEDGES.—*Independent*, March 19: On the east side of Panamint valley is a very large ledge of antimony ore. The metal was quoted recently in London at \$150 per ton. No effort has ever been made to do anything with this ledge. On the west side of the same valley is a quartz ledge 25 feet wide that is reported to carry about \$5 per ton in free gold. This ledge crops out for a distance of several miles. In Plumas, Sierra, or other mining counties, such a ledge would be regarded as a perfect bonanza, yet here no attention is given it.

LOOKOUT.—*Independent*, March 26: At the end of last week 110 tons of ore had been accumulated at the furnace at Lookout. The amount is being added to from day to day. In addition to this, two big teams are constantly on the road, hauling ore to Keeler. It will not be possible for teams to reach the charcoal heaps on the mountains sooner than another week; this will delay the lighting up of the furnace for some time yet. Smith & Wallace are

taking good ore from the Minnetta mine. The scarcity of good miners is still complained of at Lookout. At least 20 good men would find steady employment there at standard wages.

Nevada.

QUARTZ FROM THE HORSESHOE MINE.—*Grass Valley Union*, March 26: A cleanup of 23 loads of quartz from the Horseshoe mine has just been made at Sothern's custom mill, on Wolf creek, which gave a yield of \$24.25 a load, independent of the sulphurets. There was some waste rock in the quartz, otherwise the result would have been larger. The Horseshoe folks are well satisfied, and look for good yields from the mine in the future.

Placer.

IOWA HILL.—*Placer Republican*, March 23: C. F. Hoffman, engineer of the Red Point mine, came down last week, traveling part of the way on snowshoes. He reports good progress on the tunnel, which is now in 1960 feet. They expect to commence their upraise for gravel in a few weeks. The tunnel at the McIntire mine near Damascus is in 800 feet, and the upraise already commenced. The reports from the Morning Star mine continue very flattering, and work is being pushed by Elliot West, underground foreman. A new drift over 100 feet long has just been completed to an air shaft, in running which more rich gravel was found. J. H. Neff, the superintendent, was at the mine a couple of days last week and expressed himself well pleased with the work done and the present and future prospects of the mine.

San Bernardino.

CALICO'S PROSPECTS.—*Calico Print*, March 29: Last year was the dulllest which Calico has experienced since the camp was started. The discharge of the large force of miners on the King mine, only a few being retained for prospecting, and the reduction of forces on other mines, caused a great depression in the business of the town, but still there were but few failures, and most of those parties engaged in business a year ago are yet conducting their enterprises. The time has finally arrived when the hopes of the patient will soon be realized, and business will once more become lively and money circulate freely. There is something tangible for a foundation to the expectations of the most sanguine. The commencement of work on the foundation of the Oro Grande company's new 60-stamp mill speaks volumes in itself. When the mill is completed the company will then have 75 stamps to feed with ore, which will require about 200 men to do it. This alone will give a stimulus to the business of the town. When the litigation on the Jennie Lind mine is terminated, 50 or 60 men will be employed there. The Barber Co. has been purchasing a number of mining claims in West Calico, and intend to put on a large force of men to keep their 15-stamp mill running day and night. In a few months the 15-stamp mill of J. S. Doe & Co. will finish crushing the hundreds of tons of ore which they have accumulated on the dumps, and 75 men will be required in place of the few they now employ, to keep the mill in constant operation. The mines of the Silver Odessa Co. are attaining such a depth and extent in development that a much larger force will be required to keep their 15-stamp mill busy. The rich strikes by chlorides are operating better than usual. In brief the prospects of Calico are exceedingly bright, and this fall, at the furthest, will see Calico booming at a degree far ahead of anything she has experienced in the past. Already business is improving in all quarters of the camp.

WATERLOO AND HARMONIAL MINES.—A rich strike has been made in the tunnel of the Harmonial No. 1 mine, owned by Bahten & Edwards. This mine adjoins the Waterloo on the west. An immense ledge runs northwest and southeast through the eastern part of the Harmonial No. 1 and the western part of the Waterloo, extending through the center of the Harmonial No. 2, which adjoins the two above-mentioned mines on the north. A 700-foot tunnel was started several months ago on the Harmonial No. 1 mine for the purpose of connecting with the main shaft in the Waterloo, and giving that mine a convenient outlet. Recently the miners in the tunnel penetrated the ledge, and the other day struck a fine body of ore that averages 60 ounces in silver to the ton. The strike was not unexpected, as that part of the ledge on the Waterloo ground has been yielding large quantities of good ore, and hence all claims located on that ledge would naturally be expected to contain good ore. The group of mines of which the Waterloo is the center, ranks among the richest in the camp.

IVANPAH AND MESCAL.—The Cambria Mill and Mining Company, of Mescal, have purchased the mines and mill of the Ivanpah Mill and Mining Co., and intend shortly to make extensive developments on the mines of the old company, which will keep the mill in constant operation and once more make Ivanpah a lively camp. The 10-stamp mill of the Cambria Co. at Mescal is kept busy day and night, crushing ore from the Cambria mine, which is being systematically developed, and is yielding a large quantity of rich ore. The Waterman mill and mine closed down recently, not for the lack of ore, it is said, but on account of the result of the litigation which has been prosecuted over the property for several years. The hoisting machinery on the mine has been removed to Waterman & Porter's gold mine in San Diego county.

THE TAGGART MINE.—The Taggart mine in East Calico is now owned by I. Norton and I. S. Weaver, and recently they gave a lease on the mine to Fred Heber and Geo. Johnson, who have made a rich strike on the ledge which will average about \$75 to the ton.

Shasta.

PROMISING MINE.—*Shasta Co. Democrat*, March 23: Tucker is developing a very promising mine in Old Diggings district, north of the Central. The Day mine, Old Diggings, is "tied up," on account of pending litigation between the owners. Tom Greene came down from the Gulch Monday, bringing another handsome gold brick. The 10-stamp mill on the Little Gem mine at Lower Springs was started up last Thursday. It works like a top. A Chico man is building a sawmill in Bullychoop mining district, and will supply that camp with lumber. Tom Harrison brought ore to town last Monday from Old Diggings that assayed up in the hundreds of dollars to the ton. Whit George and Mike Barnes have struck a fine prospect in blue gravel on Oregon gulch, and commenced work on the claim yesterday. The shaft at Jackass flat being sunk by a lo-

cal mining company, for a blue gravel lead, is down 50 feet. At this depth indications are favorable. The lower tunnel on the Ballakalla mine tapped a fine body of ore last week, several hundred feet in depth. They have been six months running this tunnel. Mr. Loveridge and Mr. Lawrence, of Trinity county, while in town last week purchased an interest in the Lower Springs smelting works, which occasioned the formation of a new company. We understand that the company will build a new furnace. Mr. C. E. DeForest, the metallurgist, is increasing his quartz working plant by the addition of one of his patent arastras and new machinery. He is to have an engine large enough to drive four of his mills if the necessity requires. The new plant will work about 12 tons per day and will be completed about the 1st of April.

Sierra.

WILL BUILD A MILL.—*Grass Valley Union*, March 26: A mill is to be built on the Grant quartz mine, on the Middle Yuba, at a point nearly opposite Pike City, where the famous Alaska mine is situated. A wagon road is now being graded down to the mine for the purpose of getting in the necessary lumber for the mill, which, when completed, is to be run by water-power. The prospects of the Grant are reported as excellent, the vein being strong and of good quality. Robert McMurray, of North San Juan, is one of the principal owners in the mine. Several other mills are in contemplation at that portion of Sierra county, during the coming season, either on new mines or old properties that have been idle for a number of years. Sierra county has plenty of good quartz veins, and they are generally strong and well defined.

Tuolumne.

NEW MINES BEING DISCOVERED.—*Union Democrat*, March 23: Favorable reports come from the Basin region on the north fork of the Tuolumne river. Mining has been carried on in the Basin for a number of years with varying success, but for some reason no prospecting or exploring was prosecuted on the south side of the hill that lies between the north fork and the Basin. Since Messrs. Hamilton and McCann became interested in the Basin mines they have endeavored to test the value of the mineral formations surrounding the scene of their operations. There is a heavy deposit of mineral of considerable extent inside of granite formation on the east and west. Prospecting is being pursued systematically on the southern bank of the river, resulting in the finding and locating of several claims, which thus far show very favorable. None of the claims have been worked other than sinking on them a few feet. The ore shows and yields well by the tests made. The veins increase in thickness as sinking proceeds. Ore that will assay \$1000 per ton is reported to have been taken from one of them. This range of ore matter is supposed to be a continuation of the Soulsby lead on the one side and the Confidence and Excelsior on the other. Those engaged in the development feel certain that a new district is being opened which will prove to be rich and valuable. It may seem strange that this ground was never tested before where there has been so much mining in its vicinity so many years. In a mineral country like Tuolumne such surprises may be looked for at any time. There are numberless veins that have not yet been discovered that will play an important part in the future. There is quite an extent where this prospecting is being made, and if the anticipations of those engaged in it are realized, a number of mines of value will soon be in process of development.

BONANZA IN GOLD.—*Tuolumne Independent*, March 26: We learn, from a reliable source, yesterday morning, that Oliver & Co., of the Bonanza mine, in Sonora, have taken out over 300 pounds weight of gold this week—including a piece of nearly solid gold 50 pounds—and are still taking it out. They cleaned up, last Saturday, \$6000 from a carload of quartz. From rumor, we learn that, on Wednesday, they retorted and ran into a bar 100 pounds, the amount obtained the previous week. This would make, with the above, over 700 pounds of solid gold in a few weeks from this wonderful quartz mine. Tuolumne leads!

MORE STAMPS.—We learn that an addition of 20 stamps will be soon added to the Buchanan mill, making in all 40, with ability to crush 80 tons of ore per day. The mine is making a fine showing and fully sustains its reputation as one of the leading mines in the State.

Trinity.

ORO FINO.—*Trinity Journal*, March 23: The recent spell of warm weather has started all the mines to work. The Oro Fino claims are running with plenty of water for all and some to spare, with a bountiful supply of snow to insure a good season's run.

Tulare.

STAKING OFF CLAIMS.—*Visalia Times*, March 24: Renewed excitement exists concerning the mine discovered in Yokohl valley, a year or two since, and many people are staking off claims in that section. Delbert Dillon now owns the original mine discovered by Mr. Osborne, and is taking out rock and hauling it to the Dillon flour mill, six miles east of Visalia, where it is crushed in a cannon-ball arastra. The rock is said to pay well, though the amount extracted per ton is not given. A practical miner is sinking a shaft on the mine for Mr. Dillon.

NEVADA.

Washoe District.

HAYWOOD.—*Virginia Enterprise*, March 26: At this mine 16 men are now being worked. The ore extracted is being reduced at the Thompson mill, Devil's Gate. The ore mills, just as dug from the mine without assorting, from \$20 to \$30 a ton. Another mill will be engaged as soon as one can be had. Negotiations with this object in view are now being made. Pending the securing of additional milling facilities the work of opening up the mine is continued.

SAVAGE.—The north drift on the 1200 level continues to look well. It was yesterday out in the quartz deposit a little over 100 feet. The drift is running about parallel with the deposit, with half its width in ore. The vein is still presenting a fine, strong appearance, and as far as explored shows a fair quality of ore. On the 500 and 600 levels the ore is showing marked improvement in quality, and is now very fine. On the 800 level the large body of quartz found some time ago is still being explored. This quartz gives such assays as show it to be min-

eral-bearing, and at any time a body of good-paying ore is liable to be encountered in it. The company night before last shipped bullion to the value of \$20,000, making the total shipment of the month over \$48,000.

CON. CALIFORNIA AND VIRGINIA.—On the 1300 level west crosscut No. 1 from the north drift was extended 34 feet; total length, 644 feet. East crosscut No. 1 was extended 32 feet; total length, 148 feet. On the 1435 level still continue stopping out ore from bottom of winze No. 2, 165 feet south from the south line of the Ophir mine. During the week the usual amount of ore shipped to the Morgan mill and to the Eureka mill. The average assay value of the ore worked at both the above mills during the week was about the same as last week.

THE QUINN.—In about two days the timbering of the new working shaft will be completed to the water level, 110 feet below the surface. This shaft is the old air shaft, enlarged to two compartments. It strikes down immediately upon the vein, whereas the old working shaft was a considerable distance east of the vein. A larger building will be placed over the new shaft than that which was destroyed by fire six years ago.

OCCIDENTAL.—In the upper tunnel on the 48 level the south drift from the north incline winze was extended 10 feet; total length, 168 feet; No. 2 east crosscut from south drift was extended ten feet; total length, 60 feet. West crosscut No. 2 was advanced 10 feet; total length, 37 feet. West crosscut No. 3 started 50 feet south of No. 2, was advanced 13 feet. From the south drift 16 tons of milling ore were extracted.

IOWA.—Face of tunnel B is showing more favorable indications for pay ore. In face of incline shaft sinking on second back ledge to connect with B tunnel is producing some very rich gold rock. A stringer about 12 inches thick has been cut in the bottom of this incline that gives "horn" prospects free gold \$50 per ton. Tunnel A—North and south drifts are producing considerable fine free-milling gold rock.

HALE AND NORCROSS.—On the 1300 level are driving a drift south in the Chollar ground. The drift yesterday lacked 100 feet of connecting with the Chollar incline. This drift is being pushed ahead as rapidly as possible. When the connection is made, they will be enabled to crosscut a great area of new ground, in both the Norcross and Chollar, that is now stripped and ready for exploration.

GOULD AND CURRY.—On the 425 level, at a point opposite the upraise, a southwest drift was advanced 35 feet. This drift shows a mixture of quartz and porphyry. From the west crosscut, 300 level, drifts have been run short distances north and south in the old stopes. Some ore was found in the old stopes and a few tons have been saved.

OPHIR.—On the 1300 level the northeast drift running into Ophir ground from the Con. California and Virginia mine from the Ophir south line was advanced 14 feet; total length, 163 feet. The drift running north from the Consolidated California and Virginia mine was extended 20 feet; total length from the south line, 108 feet.

POTOSI.—On the 250 level good progress is making in the drift south from the Chollar line. A considerable extent of ground has been stripped ready for crosscutting. No ore is now being extracted, all the drifts and other openings in the mine being stowed full of it, there to await milling facilities.

CHOLLAR.—The old Chollar shaft has connected with the head of the old incline, 1000 feet below the surface. The result is a strong upcast through the shaft and a fine circulation of air. The plant of the Sharon shaft, up on the croppings of the lode, will soon be in readiness for ore extraction at that point.

BALTIMORE.—On the 500 level the drift which was filled with a rush of soft, flowing material (last Tuesday when the vein was cut) is being cleaned out. In the vein was found ore giving good assays, and there is a chance for a big deposit, as all for 100 feet above and 400 feet below is solid virgin ground.

CROWN POINT AND BELCHER.—No work is being done in the ore-producing sections of either of these mines. All is awaiting orders from below. Ore sufficient to keep all the mills controlled by the two companies going can be at once extracted when the word to begin the work is given.

BEST AND BELCHER.—On the 1300 level east crosscut No. 2 was extended 65 feet; total length, 144 feet. East crosscut No. 2 was advanced 69 feet; total length, 148 feet. Both of these crosscuts are in porphyry formation. No. 2 is in softer porphyry, and is still showing clay in the face.

ORST.—At this mine, situated a mile west of Silver City, much excellent milling ore is being extracted. The ore is being worked at the Briggs mill. A patent horse-whim is being put up at the mine, and the rich body of ore found on the tunnel level will be followed downward.

MEXICAN AND UNION CON.—On the 1300 level the joint Union and Mexican drift running north-easterly was extended 30 feet. The drift is now 380 feet in Mexican ground. The joint Mexican and Ophir east crosscut was extended 15 feet; total length, 260 feet.

BULLION.—East drift on 200 level out 20 feet. This drift passed through a vein of quartz 60 feet in width when out 240 feet, and is now 120 feet beyond it in vein porphyry. It is expected that another vein will be found lying in front of that which has been cut through.

YELLOW JACKET.—All is going on as usual with plenty of ore in sight. About 150 tons of ore are shipped to the Brunswick mill, Carson river. A considerable amount of work is being done in the old upper levels, where new deposits of ore are being opened up.

SILVER STAR.—The drifts north and south on the 100 level are in vein matter, yielding fair prospects in free gold. The ends of the drifts have been turned somewhat to the eastward, toward the hanging-wall. The ground in that direction seems to improve.

ALTA.—The drift on the 825 level was yesterday in 200 feet. The face was in hard rock. It has 300 feet further to go to connect with the bottom of the winze down from 725 level.

ALPHA AND EXCHEQUER.—The only work now in progress is the sinking of the shaft. This

was yesterday down 50 feet below the 120 level. Nothing is doing in the drifts on the 120 level.

ALLEN.—At the Allen mine near the Devil's Gate, the new lower tunnel has reached the vein, and has found ore that mills \$30 a ton. The new tunnel has drained and opened up a great amount of ore lying above this level.

SCORPION.—On the 500 level the east drift has been advanced 35 feet, and its face is now 147 feet distant from the shaft. The ground through which this drift is now passing is softer than heretofore.

OVERMAN.—The usual amount of ore is being extracted from the level of the Petalun street tunnel. This ore is worked at the Vivian mill.

UTAH.—On the 472 level the north drift from the main west drift was extended 40 feet; total length, 350 feet. The face is still passing through the vein porphyry and quartz.

SIERRA NEVADA.—On the 520 level west crosscut No. 7 was advanced 45 feet. It has been passing through vein matter, but the face is again in porphyry.

ATLANTA.—At this Silver City mine, John Yule, superintendent, a new tunnel is being run. It is driven ahead with two shifts of miners.

VIVIAN.—The Vivian mine, Paul Bennett, superintendent, is extracting and sending to the mills ore that works \$30 a ton.

ANDES.—The usual amount of ore is being extracted on the 200 level and explorations are continued on the 300 level.

Aurora District.

THE CAMP.—Walker Lake Bulletin, March 23: The snow is going away and spring has made part of its appearance. The arrival of Mr. Ann, of the Consolidated Esmeralda Co., is expected now in a few days, and the renewal of work on the mines of that company is also expected. The Silver Lining tunnel is making good progress, and everything about the mine promises well. The ledge continues in size and grade. It is understood that in a few days an upraise from the tunnel will be started. This upraise will connect with the old workings, and permit the extraction of ore at a very slight expense. The Silver Lining and Consolidated Esmeralda will of themselves make times lively, and in the meantime the owners of other claims are preparing for work.

Cambridge District.

NO MILL.—Walker Lake Bulletin, March 23: Cambridge is not dead nor even sleeping. All through the winter it has resembled a large incubator, many plots having been quietly hatched out, to be executed in the spring and summer. Not much work has been done in the mines for the last six months, not on account of a failure of ore, but because there was no mill to crush it. As soon as the foundation, or at least the corner-stone, has been laid for Mr. Spence's new quartz mill, work will be resumed in all the claims which have been profitable heretofore. The owners of the Sherman mine are making preparations to begin work, even if they have to build a small mill themselves. The ore which was taken out a year ago was worth \$40 a ton, and it looks like a lack of enterprise to allow such a mine to lie buried without making any effort for its further development.

Cortez District.

BULLION.—Silver State, March 23: Yesterday Wells, Fargo & Co.'s express had 35 bars of bullion, valued at \$40,000, from Wenban's mine at Cortez. The mine is said to have been purchased by the Sweetwater Mining Company for \$1,200,000.

Galena District.

SALE OF VALUABLE MINING PROPERTY.—Reese River Reville, March 25: B. F. Wilson sold his mines at Galena to R. B. Higbee, of New York, for \$100,000. The sale was completed March 17th, and includes the Humboldt and other mines, the mill property, buildings, etc. The mines comprise a valuable property, the ledge being 50 feet wide, milling two-thirds gold and one-third silver. Mills with a crushing capacity of 60 tons per day will be erected and concentrators added to collect the ore. Work will start immediately. These mines are very valuable and Galena is about to enter upon an era of prosperity. Mr. Higbee has been connected with mining for a number of years in Arizona and New Mexico, and is eminently qualified to make the mines yield a handsome profit. This is splendid news for the people of Lander county, having its mines worked under capable management. A number of wealthy New York parties are also interested in the property. Mr. Higbee will personally superintend the mines.

MINING SALE.—Silver State, March 23: B. F. Wilson, of Galena, returned yesterday from San Francisco, accompanied by Mr. Higby, a prominent mining man. Mr. Wilson has sold his gold mine at Galena to San Francisco men.

Gillie Mountain District.

THE MOUNTAIN VIEW.—Walker Lake Bulletin, March 23: Ed Woods and George Olson have a good property in the Mountain View, a claim in Gillis district. They have a ledge of good average ore, with some high grade. Several tons of rock, that will yield \$100 to the ton, are now out, and in a short time there will be a large shipment ready.

Montezuma District.

FLOURISHING.—Walker Lake Bulletin, March 23: A. A. Nickerson, of Montezuma, went through Hawthorne, last Sunday, on his way to California. He is largely interested in the Montezuma mines, and reports that camp in a flourishing condition. The mines are looking better than for a long time, and a large quantity of ore is ready for shipment. In a short time new reduction works will be built and the cost of shipment will be saved. A large number of mines will be worked as soon as the ore can be reduced in the neighborhood.

Morning View District.

A NEW DISTRICT.—Battle Mountain Nevada, March 20: J. I. Thompson and F. Hutchinson, who have just returned from Morning View mining district, speak very highly of the mines, and are firm in the belief that there is no better prospect for a genuine boom in the country than this camp offers with its big ledges of gold quartz. This district is situated in Humboldt county and is distant from here about 40 miles, near what is known as Jersey district.

Northumberland District.

CHLORIDERS.—Belmont Courier, March 26: The

chloriders of Northumberland district are taking out some good ore which is being shipped to Austin for reduction.

Philadelphia District.

HIGH-GRADE ORE.—Belmont Courier, March 21: James Lait's new find in East Belmont is looking better and better as work progresses. The ore is of a high grade. This find is in a cross ledge not far from the Belmont Company's mine, and proves conclusively that rich ore bodies still exist at or near the surface of Arizona Hill. This ore body, if it opens as it is expected it will, will give new life to mining in Philadelphia district. The mine-owners of Philadelphia district have some of the best properties in Nevada, and we cannot understand why they are allowed to remain idle. A moderate outlay of capital would soon place them on a paying basis if they were properly managed and worked for what they contain. No prospecting to speak of has been done below water level, and those who are best posted say that none of the ledges have given out. Were these mines located on the Comstock they would be giving employment to hundreds of men, and producing thousands on thousands of dollars' worth of silver bullion.

Reville District.

MILL TO START.—Belmont Courier, March 21: It is said that Reville will be a lively camp again this summer. The mill will be started up again as soon as the weather permits.

Sweetwater District.

A SALE.—Esmeralda News, March 26: It is authoritatively stated that Alex. Kilpatrick has succeeded in making a sale of the Sweetwater mill and mines at Clinton. He is on his way there from Chicago, and is said to have everything in readiness to turn over to the new company. We trust the rumor is correct, because it is a well-established fact that capital alone is all that is necessary to make the property exceedingly valuable.

Spurcemeat District.

LIVELY.—White Pine News, March 26: Late arrivals from Spurcemeat inform us that that camp is quite lively, with fair prospects of a big boom the coming summer. It is the general belief over there that a 40-ton furnace will be erected this summer. They have a mountain of low-grade ore there, which is now pretty well tested and can be worked to a profit.

Tybo District.

ENCOURAGING OUTLOOK.—Belmont Courier, March 26: Sheriff W. Brougher speaks very encouragingly of the outlook for live times in Tybo and thinks that that camp will be a steady bullion-producer for many years to come. N. S. Trowbridge is taking ore out of the 26 mine and getting ready to resume sinking. The mill will be in readiness to drop stamps about the first of May. Dimick and Luse's mine is looking well; the main shaft is down 130 feet—in ore all the way—and a level is being run from the bottom to connect with the old workings which will materially facilitate the extracting of ore. They have about 200 tons of good ore on the dump. Mr. Brougher is satisfied that Dimick and Luse have a mine. The Gilmore brothers are working their mine and taking out good ore.

Union District.

KNICKERBOCKER.—Belmont Courier, March 26: County Assessor Charles McGregor says that the Cincinnati Company, operating the Knickerbocker mines and mill in Union district, has everything in good shape for the profitable extraction and reduction of ore. Work is being pushed vigorously in all their mines. To the Storm King some very high-grade ore has been encountered. The mill is in good order and thorough repair, and is being run under the direction of the well-known millman, Thomas Mitchell. All the men that go in there are put to work.

Wild Rose District.

CONCENTRATIONS.—Silver State, March 23: One of the Paradise Valley Co.'s teams arrived yesterday with 16,000 pounds of concentrated ore. Last evening E. Reinhart & Co. shipped 31,000 pounds of concentrated ore to Argo, Colorado.

ARIZONA.

MOHAVE.—Miner, March 26: N. C. Amer brought down a couple of tons of rich ore from the C. O. D. Basin. James Twigg has a ton and a half worked from one of his claims near Chloride. Tom Burch brought up a small lot of rich ore from the Hibernia, Cedar district. H. S. Carpenter had a couple of tons of ore from the Lily of the Valley worked last week. Joe Prisk had a ton and a half of ore from the Keystone dumps through the sampling process. Charley Kelly had 18 tons of ore from the Rainbow mine near Chloride, worked last week, which went better than any previous shipment. Foster S. Dennis informs us that the showing in the Alpha mine is immense, and that he will soon commence shipping. Messrs. Kennedy and Sherman, who are working the Lily of the Valley mine under lease, sent over 12 tons of very high-grade ore. Ore from this mine usually carries over 60 per cent in lead. Tom Burch came up from the Hope mine a few days ago, and states that he has found another bunch of the rich ore for which this mine is famed.

MINERAL HILL.—Florence Enterprise, March 19: Mr. F. H. Maxfield brought down from Mineral Hill this week some very rich, malleable silver ore. He found it in the croppings of a vein lying near Mesquite springs, and has been walking over the ground for years under the impression that the lead was a worthless one. He is making preparations to chloride the vein. If he can get only one ton of ore in two months' work, it would pay handsomely, as it is worth several thousand dollars per ton. We confidently believe that some marvelous mines will yet be discovered in Mineral Hill, for it does not seem possible for nature to have made so many fine fissure veins and distributed so much mineral on the surface without concentrating in some few of the multitudinous ore chutes a vast amount of rich metal. We shall not lose faith in Mineral Hill as a high-grade district till the most thorough development proves the faith unwarranted.

IDAHO.

SHIPMENTS RESUMED.—Wood River Times, March 23: The Queen of the Hills mine, which had not shipped a pound of ore for 60 days owing to the

absence of a satisfactory contract with the smelters, has resumed operations, and is sending out 36 tons per day. This, the Bellevue Herald says, will be kept up for several months to come. The Queen's bonanza seems more extensive than ever. Bully for the Queen!

A CUSTOM MILL.—E. A. White has just completed the plan of a custom mill which he proposes to build this summer, on the bench in Croly gulch, above the Pinney ranch. The mill will have a total elevation of about 80 feet, of which 50 will be on the track floor where the cars will dump the ore on the grizzlies to the under side of the water-wheel which will supply the power. This wheel will have a 45 or 50-foot head, and can drive 40 stamps if desired. But the mill will be so made that any number of stamps, even up to 1000, can be added as long as the proper elevation can be obtained on the bench or foothill.

TRAIL CREEK.—M. S. Quist, one of the owners of the Horse Shoe, says the water in Trail creek is higher than at any time last year. It had flooded their works, and operations in the drift were suspended till the flood subsided. No damage is likely to be done on the Horse Shoe. The water had broken into Levi Smith & Co.'s works, temporarily stopping them. Geo. McCowan reports that the water prevents work on the Myrtle claim. A large amount of gravel has been washed into a large pit and also into the drain race on the Miller claim, and John Hermann's works on the Black Hills are slightly damaged.

CANYON CREEK.—From J. J. Barret, who came in from Canyon by way of Gorge gulch and Granite creek, Saturday evening, we glean the following items. Mr. Barret has just completed a 200-foot contract on one of the tunnels on the Tiger mine; the tunnel was in 100 feet when the additional 200 feet was let. In this 300 feet there is no space 25 feet in length where good pay is not found, neither are any walls encountered, the entire breast at all times being in solid ore. A concentrator will be erected near the mine this spring. Armstrong & Co. have commenced work on the Hidden Treasure and Bengal Tiger fraction. The Tiger vein has been traced and located on the surface 7700 feet. The snow is fast disappearing and in a short time there will be a lively scramble for vacant grounds.

PONY GULCH.—Wm. McCormick came in yesterday from Pony gulch to get two claims recorded near the Fay Templeton, which is beginning to attract attention on account of the high grade of its ore. McCormick states there is quite an excitement there at present on account of the recent developments. There are quite a number of men in the district; he met to go in packing their blankets as he came out. The Fay Templeton, Mammoth, Jim Blaine and Brooklyn are the principal locations at present. Jas. Mullaly has let a contract for 100 feet of tunneling on the extension of the Fay Templeton. These mines are situated on Pony gulch about four miles from Delta. A trail has been shoveled out from the main road to the leads.

SMOKY DISTRICT.—George Montgomery got back yesterday from Smoky. He reports the Smoky mines as "looking finer than silk," and likely to make heavy shipments this summer. The King of the West is showing better with every day's work done upon it. The incline is now down 160 feet below tunnel level, and a sump is being sunk preparatory to crosscutting. At the head of the incline a vein of 14 to 16 inches of first-class ore was shown up on the footwall. In sinking about 60 feet this ore-vein widened to over six feet. At this point the vein straightened, but the incline was continued as originally started. As it got down toward the 100-foot level, seams of galena came in on the hanging-wall side, and at a depth of about 110 feet these seams carry from four to eight inches of solid galena, leaving the main body of ore still on the footwall. In the Tyrannis, Yount, the leaser, is working in about 30 inches of solid ore carrying over 125 ounces of silver per ton. Mr. Dollarhide's mine shows a continuous ore-chute in every opening so far made. They have three or four levels, all showing ore. The owners of the Flagstaff are also taking out good ore, with large bodies of second-class ore in sight. All the other Smoky mines that are worked at all are looking better than ever before.

PLACER NOTES.—Coeur d'Alene Record, March 22: Coban, Vestal and Murphy have six men at work on the Buckskin No. 1 claim. Operations have commenced in Missoula and Dream gulches. Three men began the season's work on the Vestal Consolidated above the Badger in Alder gulch this morning. The water is flowing through the California ditch. The miners of Beaver, Trail and tributary gulches are preparing for active operations in the near future. As the present thaw continues the old claims will all be working in a few days and many new ones started up.

NEW MEXICO.

GOLDEN.—Coeur d'Alene Record, March 21: The San Pedro Company has recently concluded a large sale with Eastern capitalists. They have disposed of the pipe line from the Sandia mountains to the rich placers at San Pedro, and the new company will at once commence and repair the mountain dams, and put the pipe line in order for operations. As is well known, the placers on the San Pedro grant are probably the most extensive and richest in gold of any known in America. The fields have been known for over 40 years, and their actual value has long since been repeatedly and time and again shown up. It has been known that there are several thousand acres of gravel which will pay \$1.25 per cubic yard to work, and that would make fortunes for any company who had the necessary capital to work the same. Mr. Geo. B. Chittenden, general manager, at San Pedro, as an experiment, ran 40 tons through the stamp-mills recently and the run averaged \$1.25 per ton, and as a cubic yard contains 3000 pounds, or 1½ tons, it averaged about \$1.67 per cubic yard. As there are millions of cubic yards that can be washed by hydraulic power, some idea can be formed by the enormous amount of gold these placers contain. The San Pedro Company has recently revoked its present rules and regulations and leases, and issued new ones to prospectors. These latter issues are more liberal, and an effort is evidently made to treat prospectors' rights and interests in a fair way. The company appreciates the importance of having prospectors come on the grant, and knowing as

they do, and as the prospectors do, that the grant will show up in minerals superior to any other mineral region heretofore, they propose, by liberal offers and fair treatment, to get the property developed. The new leases will be here from New York in a few days, and will be distributed among prospectors. Golden is full of miners and prospectors, and the town presents a more animated appearance than for years. We feel that the boom is bound to come, and that Golden and San Pedro will yet be two prosperous and busy mining centers.

SOCORRO.—Bullion, March 26: Richard Mansfield White, owner of the Palomas Chief, brought in a car of high-grade ore to the Graphic smelter last Tuesday for treatment. We give the following return from the Graphic smelter upon the two carloads of ore sent from the Caverio mine in the Magdalena district, by Judge Keeney, on the 21st of March: Lead, 29.20 per cent; silver, 10.80 ounces; gold, 1 penny-weight. J. S. Eddy and W. B. Foster dispatched men to open up their Commercial Union claim in the Socorro or Incarnacion mining district, on Thursday. They will improve their property by sinking a five by seven shaft on their spar vein. The ore very much resembles that afforded by the Merritt mine and assays indicate the mineral from the 24-inch vein to possess from 20 to 60 ounces silver and some gold. It is free-milling ore. Rev. J. M. Robinson returned from Garcia canyon on Saturday last, where he had spent several days, enjoying the sight of his auriferous strike in his extension of the Iron Mask. The property is owned by this gentleman and his associate, Mr. Glasson. It furnishes increasing bodies of gold quartz, galena, sulphate of lead, associated with hematite iron. Mr. Robinson is very much encouraged by the promising condition of his claims and will now devote much more of his attention to their development.

MONTANA.

PLACERS.—Inter-Mountain, March 26: The Libby creek placer mines between Flathead lake and the Kootenai country are likely to have a boom this year. At present there are only about 15 white people and an equal number of Chinese there. One claim produced about \$2000 last summer, the result of one man's work. The gold is fine but heavy, and goes \$19 to the ounce. Hauser & Holter, of Helena, have arranged to buy a half interest in the Curlew mine in Sweetwater district, Bitter Root valley. Blake & Hackett have a bond on the mine for \$10,000, and the Helena men are to take this up for a half interest in the property. It is said that \$15,000 has been offered and refused for the ore on the dump. At Argenta they are just beginning to reap the fruits of poor old man Booth's faith that rich mines existed there. He never found any himself, but those who came after him have. He professed to have an infallible theory by which he could tell where rich mineral existed. The instrument used was a cow's horn partly filled with minerals and what not, which he held in his hands and paraded over the ground, and where the point of the horn happened to turn, there he said the body of ore rested.

OREGON.

AT WORK.—Jacksonville Times, March 20: Some prospectors from Colorado are at work in the southern portion of Josephine county. A 10-dollar nugget was recently picked up in the claim of Birdsey & Mathis in the Foothills creek district. Charles W. Cornelius, one of the owners of the quartz mill which has been crushing ore at the Swinden ledge, has returned from a trip to Portland. The warm weather has had the effect of decreasing the supply of water perceptibly, and some of the miners will soon be compelled to clean up if timely rains do not intervene. Klippel & Bumble have a force of men at work repairing the road to their mill and will soon commence crushing a large amount of quartz from the mines in Jackson Creek district. Reduction works will be put up at East Portland at once and will be ready for business about the first of May. The delay was occasioned by the difficulty of securing ores in the winter. We are glad to see Portland capitalists awakening to the necessities of the hour at last.

ALL AT WORK.—Oregon Sentinel, March 19: Henry Ankeny, of Sterling, came to town last Tuesday. He reports the Sterling miners all at work, and an abundance of water. In the Ankeny mines two giants are at work day and night and are removing an immense amount of gravel. They expect a late run, as there is more snow in the mountains than there has been for years.

UTAH.

PARK NOTES.—Record, March 26: We are informed that the Anchor Mining Co.'s management has in contemplation the driving of a deep tunnel from the south through the White Pine divide, and thus relieve by drainage the large amount of water that now impedes progress of development. At the same time this tunnel would fully prospect a large area of country, the surface indications of which give great encouragement. It, however, seems to us that a more feasible plan would be to follow the scheme that Col. O. J. Hollister attempted to inaugurate here years ago—that of incorporating a large tunnel stock company composed of the Ontario, Daly, Anchor, Sampson, Boss, Crescent, and all other companies on the great mineral belt, for the purpose of running a deep drain and prospecting tunnel from the east, starting in the vicinity of the mouth of McHenry canyon, to the east of the Ontario. It is not unsafe to predict that this scheme will yet be adopted, and at an early day too. The Putnam group is south of the Daly, and enough work has been done on the property to demonstrate its richness and entitle it to Government patent. It is understood that active development work will soon be renewed on the tunnel. Surface water is causing a little trouble in the upper workings of the Crescent. Owing to the bad condition of the roads and the fact of improvements going on at the Mackintosh sampler, the shipments of Ontario and Daly ore have been cut off the past 10 days. Roscamp & Glenn are preparing to work their claims at the head of Tbayne's canyon on a larger scale than ever this year. Thursday, two Kentuck gold bars from Idaho were remelted and re-assayed at the Marsac mill. The result was one bar containing 87½ fine gold ounces, and it was shipped to San Francisco yesterday morning.



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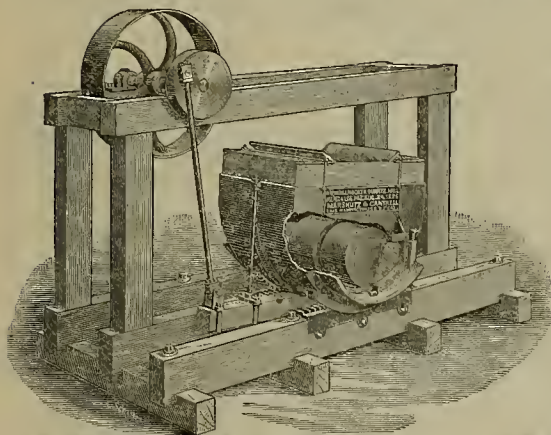
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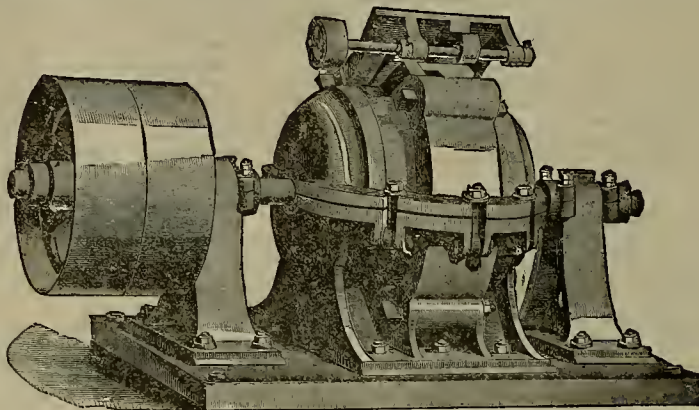
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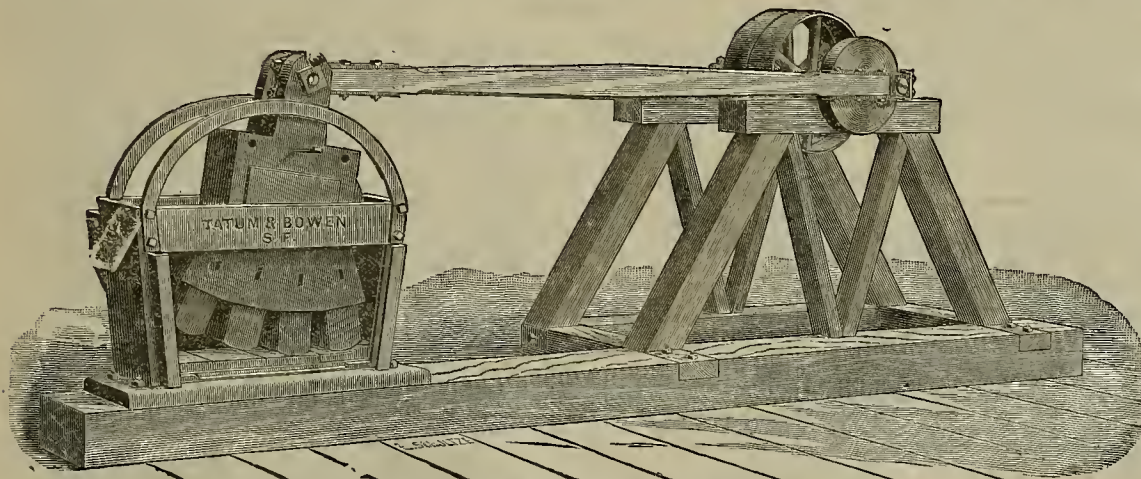
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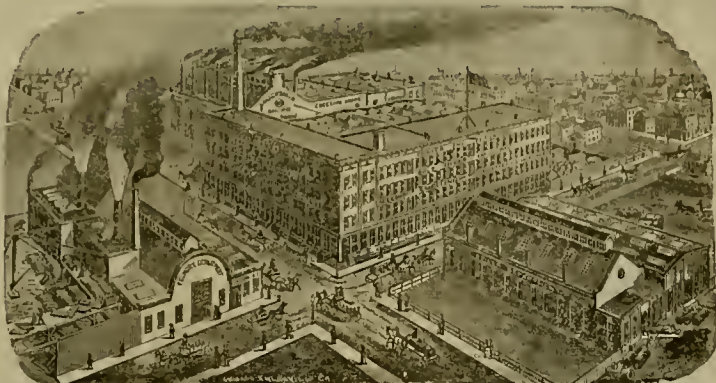
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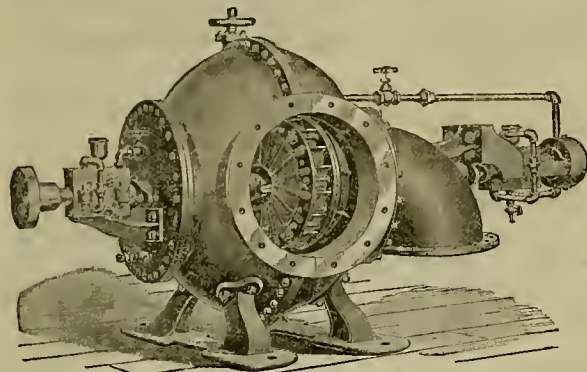
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FOR WEEK ENDING MARCH 22, 1887.

- 359,764.—PUMP—L. L. Bettys, Mountain View, Cal.
- 359,764.—ORE CONCENTRATOR—F. A. Herring, Reno, Nev.
- 359,929.—SNAP-HOOK—Kinsley & Heusser, Taylor, Nev.
- 359,930.—WINDMILL—J. N. Knox, San Jose, Cal.
- 359,974.—LAMP REFLECTOR—J. Levy, S. F.
- 359,932.—CAN-LABELING MACHINE—A. J. Lockhart, Marshfield, Ogn.
- 359,981.—UMBRELLA DRIP CUP—A. G. Nygard, S. F.
- 359,886.—FRUIT JAR—Jos. Perkins, S. F.
- 359,640.—RAILWAY CAR—C. W. M. Smith, S. F.
- 359,650.—WASH-BOILER—H. H. Tuttle, S. F.
- 14,177.—TRADEMARK—Eureka Packing Co., Eureka, W. T.

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Mining Share Market.

The prices of stocks still continue low. The situation on the Comstock has developed no features of late to start prices upward. Nevertheless, the Virginia Enterprise says: W. S. Hobart, who left here last evening for San Francisco, carefully examined all the levels of the middle mines and expressed himself greatly pleased with what he saw. He will return to the Comstock in about ten days to remain among us all summer. Before that time an upward movement, or the beginning of it, is likely to be seen. About that time the work of putting up reduction works here on the lode will be commenced with a rush.

The yield of \$48,000 from 2000 tons of ore, crushed this month, is good evidence that the Consolidated California and Virginia is not the only producing mine at this end of the lode. Had they mills in which to reduce their ores, they could keep up the same showing right along.

Outside of this city and Gold Hill, several mines to the southward, about Silver City, are coming to the front as regular ore-producers. A few of these are mentioned below. In addition, we may mention that Piper's mine is yielding ore that mills \$25 to \$30 a ton; Herman J. Scheel is getting out good ore, and Geo. W. Cooke has struck good pay in ground adjoining the Allen mine, while quite a number of men have small veins, worked as individual claims, that pay them more than miners' wages.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court Department 10, San Francisco:

UNION FENCE CO. March 20. Object, to manufacture fences. Capital stock, \$100,000. Directors—Edward Clark, George Cottrell, J. D. Sullivan, M. Livingston and Thomas E. Cooney.

NAVAJO G. & S. M. CO., NEV. March 28. Capital stock, \$5,000,000. Directors—Irvin C. Stump, W. E. Norwood, E. M. Raitton, Geo. R. Sanderson and James Adams.

BANNER M. CO. March 28. Location, Nev. Capital stock, \$1,000,000. Directors—John T. Davis, S. M. Holmes, A. Snider, E. M. Raitton and John M. Pierson.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Con. California and Virginia, March 29, \$41,502; total to date for March, \$165,450; Eureka Consolidated, 28, \$18,000; Candalaria Co., 25, \$11,000; Alice, 24, \$27,000; Bluebird, 23, \$27,000; Hanauer, 24, \$50,75; Bannock, 24, \$1600; Queen of the Hills, 25, \$6220; Hanauer, 25, \$2850; Alice, 21, \$16,213; Moulton, 21, \$16,000; Richmond Con., 23, \$18,672; Savage, 24, \$20,000; total for March to date, \$48,000; Hanauer, 27, \$5330. Last week Wells, Fargo & Co. shipped from Salt Lake \$65,857; McCormick & Co., \$63,255; T. R. Jones & Co., \$16,383; Union Bank, \$13,213.

Complimentary Samples.

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ASSESSMENTS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S. M. Co.	Nevada.	35.	50. Feb 9.	Mar 16.	324 Montgomery St.
Baker Divide M. Co.	California.	33.	25. Mar 19.	Apr 19.	330 Pine St.
Best & Belcher M. Co.	Nevada.	36.	50. Mar 5.	Apr 15.	309 Montgomery St.
Bodie Tunnel M. Co.	California.	14.	25. Feb 8.	Apr 6.	309 Montgomery St.
Ballistic M. Co.	Nevada.	10.	25. Feb 9.	Apr 6.	310 Pine St.
Caledonia M. Co.	Nevada.	42.	15. Mar 1.	Apr 25.	414 California St.
Camp Creek Placer M. Co.	California.	1.	10. Jan 20.	Mar 10.	306 Pine St.
Comstock M. Co.	Nevada.	3.	15. Mar 14.	Apr 18.	309 California St.
Con Washoe M. Co.	Nevada.	2.	10. Mar 21.	Apr 10.	314 Montgomery St.
Dolores Con M. Co.	Nevada.	4.	05. Mar 2.	Apr 11.	315 Pine St.
Gover Improvement Co.	California.	2.	10. Feb 28.	Apr 11.	318 Pine St.
Gould & Curry S. M. Co.	Nevada.	55.	50. Mar 8.	Apr 11.	309 Montgomery St.
Hale & Norcross M. Co.	Nevada.	33.	50. Mar 9.	Apr 11.	309 Montgomery St.
Inyo Marble Co.	California.	1.	01. Mar 15.	Apr 13.	324 California St.
Livermore Oil Co.	California.	1.	05. Mar 8.	Apr 12.	339 Montgomery St.
Mayflower G. M. Co.	California.	25.	25. Mar 23.	Apr 25.	328 Montgomery St.
Manhattan M. Co.	Nevada.	5.	1.00. Mar 23.	Apr 25.	327 Pine St.
Navajo M. Co.	Nevada.	17.	25. Mar 13.	Apr 21.	310 Pine St.
Nevada Queen M. Co.	Nevada.	2.	10. Mar 10.	Apr 10.	309 Montgomery St.
North Belle Isle M. Co.	Nevada.	12.	50. Mar 14.	Apr 19.	310 Pine St.
Potosi M. Co.	Nevada.	27.	30. Mar 9.	Apr 14.	309 Montgomery St.
Philips Manufacturing Co.	California.	1.	5.00. Feb 12.	Mar 21.	17 Drumm St.
Rhineclay M. Co.	California.	3.	13. Mar 1.	Apr 15.	309 Montgomery St.
Sagehen M. Co.	Nevada.	67.	01. Mar 15.	Apr 10.	324 California St.
Spring Valley M. Co.	California.	2.	34. Jan 27.	Mar 5.	320 Sansome St.
Sierra Iron Co.	California.	6.	2.50. Feb 12.	Mar 30.	431 California St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Bulwer Con M. Co.	California.	L. Osborn.	334 Montgomery St.	Annual.	Apr 13
Diana M. Co.	California.	P. J. Flanagan.	315 Pine St.	Special.	Apr 11
Grimania Lead Works.	Utah.	J. M. Quay.	314 California St.	Annual.	Apr 6
Herbert Concentrator Co.	California.	M. Livingston.	330 Montgomery St.	Annual.	Apr 12
J. Curry M. Co.	California.	A. D. Brown.	309 Montgomery St.	Annual.	Apr 5
Original Gold Hill M. Co.	Nevada.	J. M. Huntington.	309 California St.	Annual.	Apr 4
Plumas Con M. Co.	California.	A. Halsey.	323 Montgomery St.	Special.	Apr 9
San Jose de Gracia M. Co.	Mexico.	C. A. Morse.	217 Sansome St.	Annual.	Apr 2
Trinity M. Co.	California.	J. M. Selfridge.	504 Kearny St.	Annual.	Apr 7

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Con California & Va M. Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50.	Mar 4
Martin White M. Co.	Nevada.	J. J. Scoville.	309 Montgomery St.	25.	Dec 20
Paradise Valley M. Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	10.	Nov 30
Paradise East & Soda Co.	California.	A. H. Clough.	431 California St.	10.	Apr 7
Silver King M. Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Mar 15

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar. 10.	WEEK ENDING Mar. 17.	WEEK ENDING Mar. 24.	WEEK ENDING Mar. 31.
Alpha.	3.25	4.00	4.25	51
Alta.	1.60	1.70	2.40	2.50
Andes.	1.15	1.30	1.25	1.50
Argenta.	2.85	3.10	3.25	3.70
Belcher.	1.70	1.70	1.70	1.70
Best & Belcher.	10	11	10	12
Bullion.	2.40	2.80	2.70	3.20
Bullion.	.65	1.00	1.00	1.20
Bodie.	2.85	3.30	3.25	3.00
Bodie Con.	.50	.75	.75	.65
Bodie Tunnel.	1.10	1.30	1.10	1.25
Con. Va. & Cal.	164	172	171	154
Challenge.	2.15	2.35	2.30	2.90
Champion.	7.25	7.75	7.75	9.00
Chollar.	2.00	2.00	2.00	2.75
Con. Imperial.	2.00	3.05	3.05	2.75
Caledonia.	.50	.55	.55	.45
Con. Pacific.	.30	.30	.30	.30
Crown Point.	3.85	4.00	4.55	4.50
Lady Wash.	1.00	.75	.75	.65
Central.	.60	.75	.75	.65
Dudley.	1.40	1.50	1.40	1.45
East B. & B.	1.40	1.50	1.40	1.45
Eureka Con.	1.40	1.50	1.40	1.45
Excelsior.	2.00	2.00	2.00	2.75
Grand Prize.	5.00	5.00	5.00	5.00
Gould & Curry.	5.00	5.00	5.00	5.00
Hale & Norcross.	4.75	5.00	5.00	5.00
Holmes.	3.50	3.50	3.50	3.50
Independence.	70	75	80	110
Iowa.	.35	.60	.60	.45
Julia.	1.40	1.45	1.60	1.80
Justice.	1.40	1.45	1.60	1.80
Kentuck.	.50	.50	.50	.50
Lady Wash.	1.00	.75	.75	.65
Martin White.	1.40	1.50	1.40	1.45
Mono.	2.60	3.00	2.65	2.50
Mexican.	5.50	6.75	6.00	5.25
Mt. Diablo.	4.00	4.00	4.00	4.00
Northern Belle.	.90	.95	.85	1.00
Navajo.	4.60	4.70	4.80	5.25
North Belle Isle.	1.40	1.45	1.40	1.45
Nias.	1.40	1.45	1.40	1.45
Nev. Queen.	1.40	1.45	1.40	1.45
North G. & C.	4.00	4.00	4.00	4.00
Occidental.	3.00	3.00	3.00	3.00
Ophir.	9.25	11	12	83
Overman.	1.60	1.70	1.80	2.00
Potosi.	8.00	8.00	8.00	8.00
Peerless.	.60	.65	.65	.55
Peer.	.45	.50	.40	.35
P. Sheridan.	.05	.10	.10	.10
Silver Star.	4.50	5.00	5.00	5.00
Sage.	4.50	5.00	5.00	5.00
Seg. Belcher.	4.40	4.90	4.80	5.25
Sierra Nevada.	4.40	4.90	4.80	5.25
Silver Hill.	.35	.40	.40	.45
Silver King.	.35	.40	.40	.45
Sorpion.	.25	.25	.25	.25
Syndicate.	3.55	4.00	3.95	4.50
Union Con.	1.50	1.75	1.50	1.65
Utah.	4.80	5.25	5.00	5.50
Yellow Jacket.	4.80	5.25	5.00	5.50

Sales at San Francisco Stock Exchange.

THURSDAY Mar. 31, 1887.	300	Independence.	50c
299 Alta.	1.90	100 Julia.	.35c
1000 Andes.	1.00	230 Justice.	1.30
710 B. & Belcher.	.50	150 La. Pauta.	1.85
320 Bullion.	1.90	100 Mt. Cory.	.8
100 Bodie Con.	2.25	50 Mono.	1.80
300 Belcher.	2.80	100 Mt. Diablo.	4.10
50 Baltimore.	.70c	250 Navajo.	1.05
100 Belle Isle.	.60c	400 Nev. Queen.	2.40
200 Benton Con.	.60c	310 N. Belle Isle.	.70c
100 Bulwer.	1.20	790 Ophir.	.60
150 Chollar.	.50	300 Overman.	1.45
400 Con Va. & Cal.	1.13	200 Potosi.	.60
100 Crown Point.	.70	500 Peerless.	.35c
300 Crocker.	.90c	150 Peerless.	.55c
275 Central.	.70c	150 Savage.	.5
3.0 Caledonia.	.35	485 Sierra Nevada.	5.20
200 Challenge.	2.15	330 Union Con.	2.00
150 Confidence.	.40	500 Utah.	.90
350 Exchequer.	1.30	450 Weldon.	1.1
600 Gould & Curry.	3.10		
350 Hale & Nor.	3.40		

THE Potosi Mining Co., whose mine is on the Comstock, has elected the following officers: A. K. P. Harmon, president; W. E. Sell, vice-president; C. T. Badge, A. W. Rose, Jr., and Joseph Marks, directors; C. E. Elliot, secretary.

THE Hale and Norcross Mining Co. has elected the following officers: M. H. Levy, president; Jos. N. Souther, vice-president; W. E. Sell, C. T. Badge, A. C. Hamilton, W. C. Watson and M. Hoeftich, directors; J. F. Lightner, secretary.

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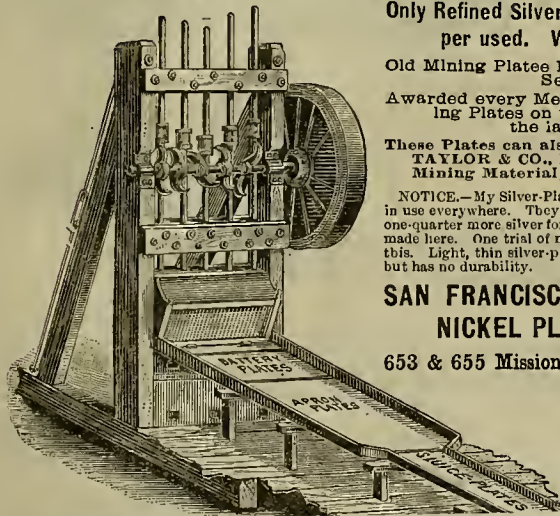
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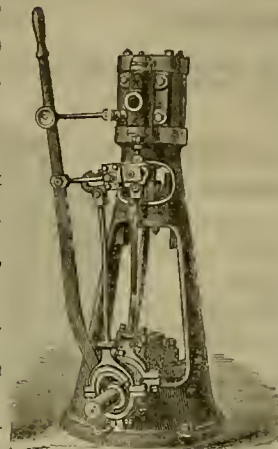
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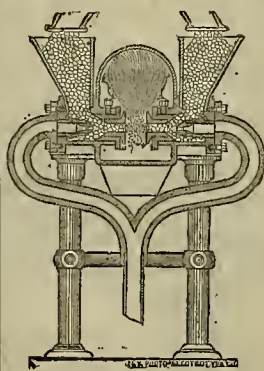
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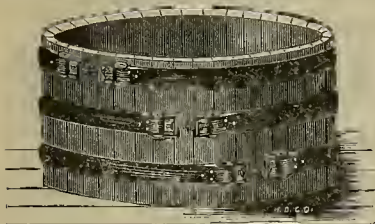
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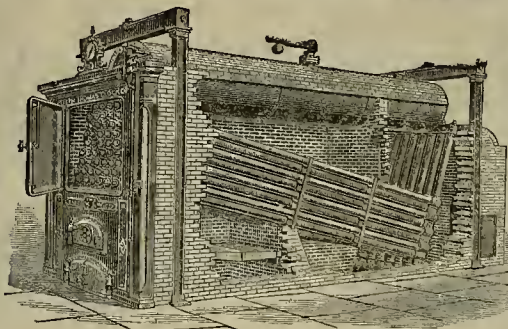
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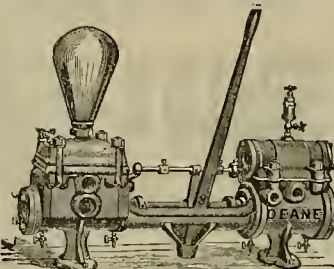
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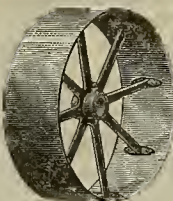
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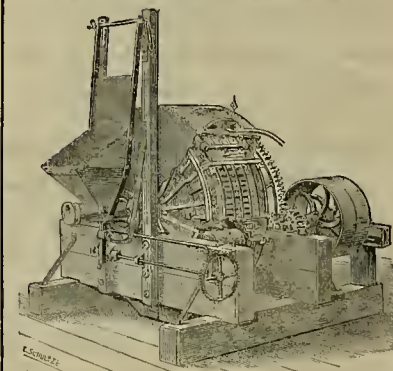
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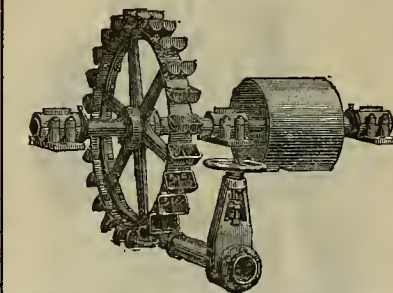
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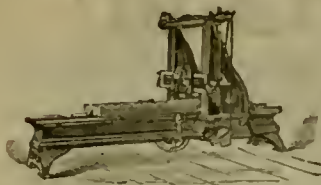
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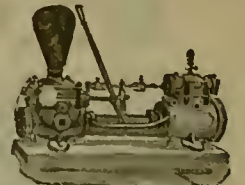


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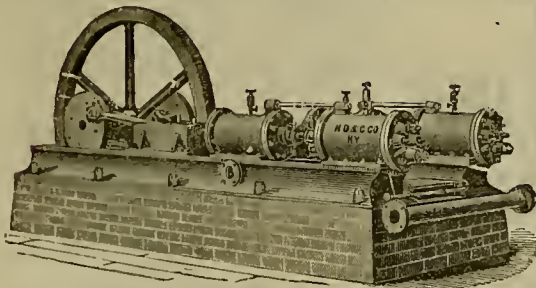
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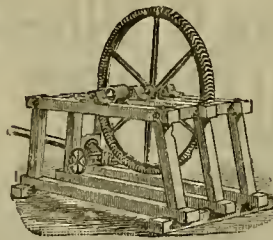
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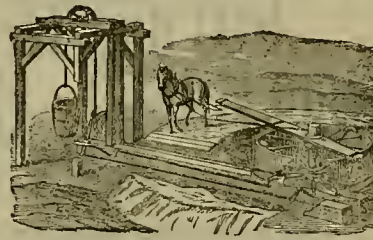


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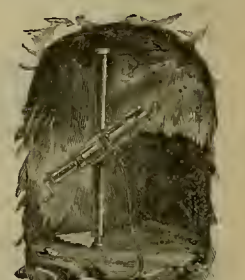
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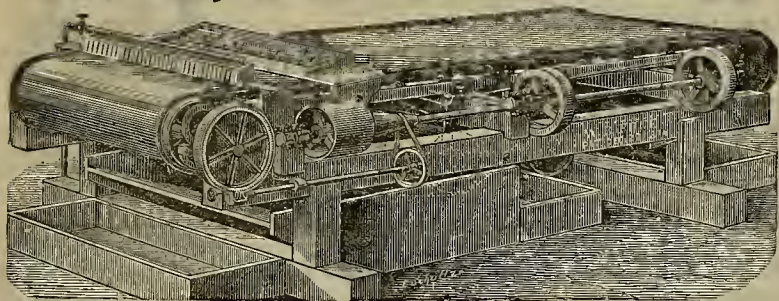
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MESSRS. ALDEN, SAMPSON & CO., OF NEW YORK, say: "The 200 and 350-horse power Hazelton Boilers which we have at our Works at New town, N. J., as well as the 40-horse power in use at our factory at Hallowell, Maine, are giving good satisfaction. We consider them very economical in fuel, easily kept clean, rapid producers of an abundance of dry steam, and perfectly safe."

THE JERSEY CITY STEEL COMPANY, of Jersey City, N. J., are using two 100-horse power, utilizing the waste heat from flue boilers. The Manager says: "Each Boiler gives us from this waste product nearly 100-horse power, after passing through a 30-foot Flue Boiler. They require no repair, we experience no trouble in keeping them clean, and they are every way satisfactory. The quantity of fuel to produce a given result is decidedly less than any Boiler we have ever used."

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HENRY DISSTON & SONS, OF PHILADELPHIA, the well-known saw manufacturers, after running a 60-horse power Hazelton fourteen months, ordered seven more for their works in Tacony, Pa. The General Manager says: "The 60-horse power Boiler bought fourteen months ago has developed an average of 85-horse power, and it has not scaled or given us a particle of trouble. We consider them the best Boiler made."

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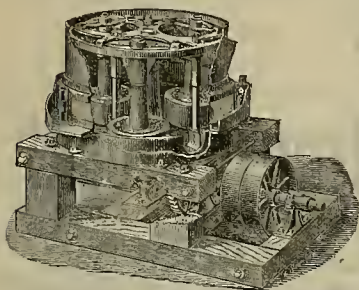
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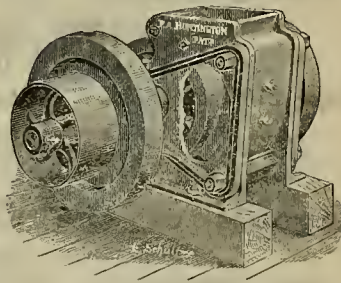
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WEIGHT, 4 TONS.

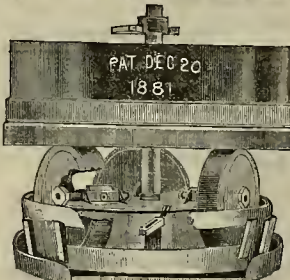
It is a full fledged Quartz Mill without gearings, coze or pulleys.

Power applied direct. Works Ore at Low Cost
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Very little friction. Beats other machines in reducing and amalgamating ore, and costs less. All who have used this mill recommend it highly. Splendid for low-grade ore on account of low cost of working.

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The Granite Mountain.

A Famous Montana Gold Property.

We give in this issue of the PRESS a sketch of the workings of the celebrated Granite Mountain gold mine. The mine is located in Deer Lodge county, Montana. It is some 50 miles west of Butte and about midway between Anaconda, on the Utah Northern branch of the Union Pacific system, and Drummond, on the main line of the Northern Pacific R. R., which is by far the pleasantest route to take to get there except in the midsummer season, on ac-

count of their ore body. Of that there is but little fear, as their lower levels have continually developed richer and more extensive ore chutes than were obtained nearer the surface.

Conservative estimates on the ore bodies now in sight have placed the value at many millions. Consequently they will have no difficulty in keeping their works constantly running with the present brilliant results for years to come.

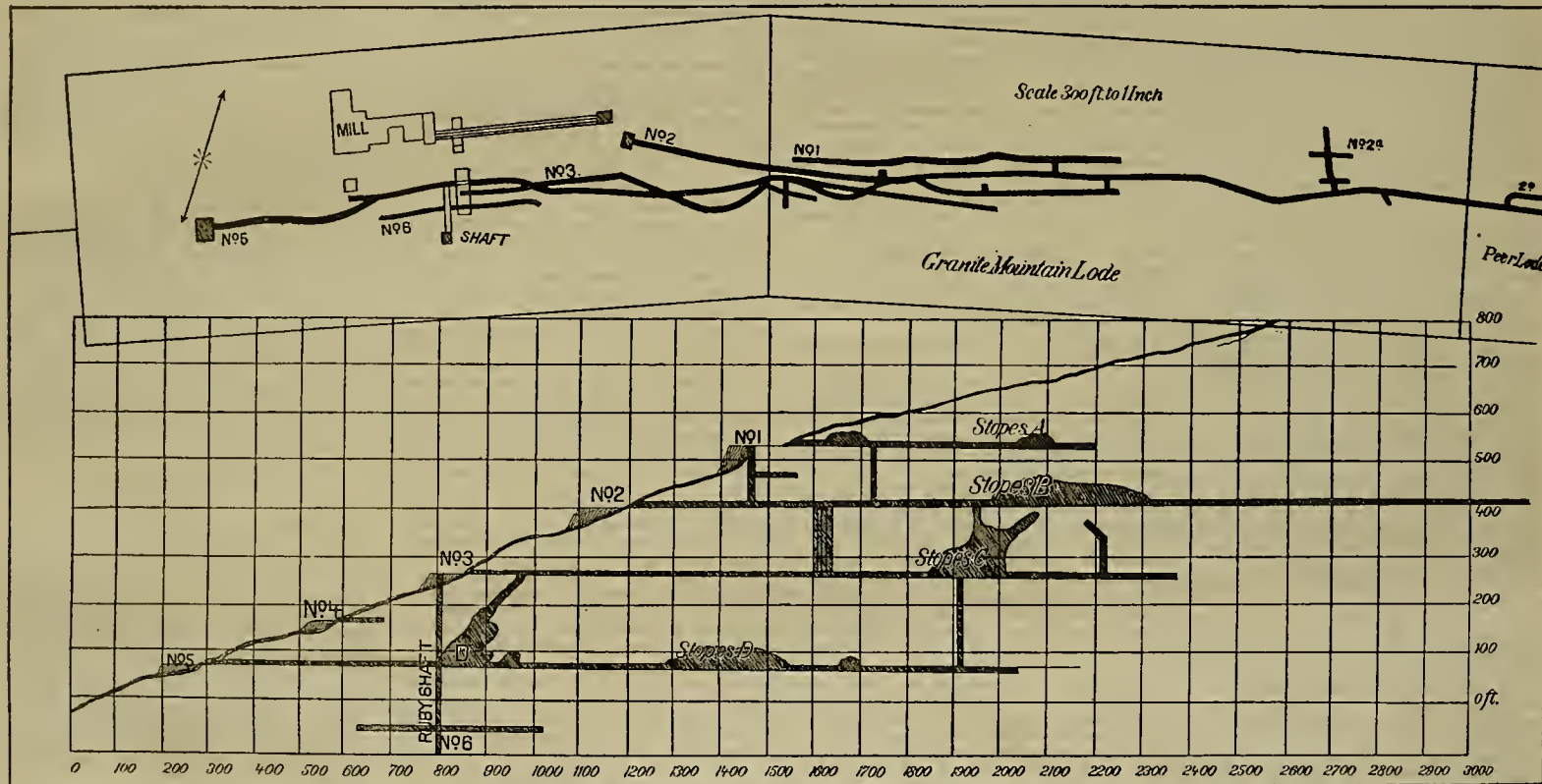
They are placing on the Ruby shaft at No. 3 level a hoist and pumping apparatus capable of carrying the work to a depth of 3000 feet.

years' experience in superintending properties of this kind make it almost needless to say that he is the right man in the right place. By referring to his annual report we see that not the smallest item escapes the watchful eye of the superintendent. Details are complete of everything. The amount of supplies, wear and tear, labor, and in fact everything, is taken up in its regular turn and averaged up so that an extra expense in any one item will be immediately noticed and looked into by the proper authorities.

In the engraving, Nos. 1, 2, 3, and so on, in-

Company as an adjunct, has been sufficient to induce railroad capital to connect them with the main line.

The Bimetallic Company is an incorporated company. Some of the Granite stockholders are also interested here, and they are energetically developing the western extension of the Granite lead under the name of the Jas. G. Blaine. They have been so well satisfied with developments thus far that they have purchased a 20-stamp mill that was erected on the Algonquin mine some years ago and failed to pay. This plant was a very complete one at



SKETCH SHOWING WORKINGS OF THE GRANITE MOUNTAIN MINE, MONTANA.

count of having the high Cahle divide to cross between Anaconda and Phillipshurgh. At present, stage lines run daily from each point to Phillipshurgh and accommodate the travel to this prosperous mining camp. Our correspondent, R. G. Huston, who visited the mine not long since, gives us some further facts concerning the property, as follows:

The output of this mine since April, 1885, has been simply wonderful—the dividends to Jan. 1, 1887, running very close to \$100,000 per month, notwithstanding the large amount of development work going on and the large and expensive plant being placed thereon. They started first with 20 stamps; six months afterward they added 10 more stamps, and now have an additional 40 stamps running. All the improvements have been promptly paid for from the output of the mine, and dividends are being paid regularly.

With the increased capacity of their works, the company will be enabled to work a large amount of lower-grade ore that they have heretofore left untouched, and thus keeping up their output to the present amount, and still

When this is fully completed, there will apparently be nothing further for the Granite mine to do but continue work and declare dividends on their 400,000 shares of from 25 cents to 50 cents per month. The present value of their stock is about \$65 per share.

The company carries large stores of supplies shipped in during the summer season, and blockades on the railroads in winter have no effect on the equanimity of the managers. It is a wise idea, as was proven by the conduct of the mines and mills at Butte during the winter. Heavy storms of weeks' duration are likely to occur any winter in Montana and should be provided for in the fine summer weather.

The low prices of silver resulted in a loss of nearly \$100,000 during the past year to the Granite Mountain Co. This loss, of course, fell on all silver-producers alike, and while it does not prevent this company from continuing their large dividends, it is equally undesirable.

Capt. John W. Plummer is still the leading spirit at the Granite mine, and under his skillful guidance there is no question about the prosperity of the company. His many

dictate the tunnels, and the different stops are lettered. In the various stops the ground has been systematically hocked out with a view to economize production. The company milled last year 8428 tons gross weight. This yielded 1,384,216 ounces of silver and 380 ounces gold. They saved in milling 95 per cent of assay. The average cost of milling, including labor, supplies, etc., was \$13.71 per ton.

The company employ directly between 200 and 300 men, and probably as many more gain their daily bread from the same source indirectly. A town with a population of nearly 1500 people has grown up on the mountain-side below the mine in which all the different lines of business incident to supplying that number of people with their daily needs are represented.

It is four miles down the mountain west of Granite to the old town of Phillipshurgh. This place, one of the oldest quartz-mining camps in Montana, will this summer be connected with the outside world by railroad by a branch from the Northern Pacific from Drummond. The record of the Granite mine for the past two years, with the old Hope Mine and Milling

the time it was placed here, but owing to the advancements made in milling silver ores will require a complete refitting, which they will have done by May 1st. They will only have one and a half miles to transport their ores to this mill, making it about as convenient as if they had built it to order. In a short time no doubt we shall hear of favorable results from the Bimetallic. J. B. Risque is the superintendent of these works.

The West Granite is also an incorporated company, with an immense capital stock. The owners are energetically at work developing a mine on their property which lies south of the Bimetallic Works. Many reports of strikes of ore have been circulated concerning the West Granite, and the truth of them could not be ascertained. "This much," says Mr. Huston, "I do know, that they are showing a large amount of energy in prosecuting their prospecting, and are deserving of a good strike whether they get it or not. J. K. Pardee is the general manager of this enterprise, and most of the stock is held by residents of Helena and St. Louis."

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Working Flat Gravel Ground.

A Machine for Removing Rock from Ground-Sluices—Process of Working at Alder Gulch, Montana.

EDITORS PRESS:—Alder Gulch, which has given many millions to the world since its discovery in 1863, still retains enough of the "pracious" to reward intelligent labor for many years to come. The bulk of this was mined the first two seasons after discovery, the primitive methods made necessary by the then small holdings leaving a considerable percentage of gold behind in the old workings. Later these small holdings passed into the hands of a few companies and individuals, and reworking by bedrock flumes and other appliances was commenced.

The lower half of the 15 miles of gulch has but little fall, and for this reason, and because this division is in half a dozen separate holdings, none but the finest portion of the gravel can be allowed to pass off through the bedrock flumes, which are necessarily of very light grade.

With the intention of consolidating this flat portion of the gulch and bringing water from the large streams on either side, companies were formed some years ago; but the engineering difficulties were found to be so great as to not warrant the outlay necessary for such an enterprise. Such being the situation, the different companies were compelled to each take the water of the gulch at their upper line at the creek level, and deliver it below in the same manner. The use of water under great pressure was not possible for this reason, and because the banks on either side were low.

The Mode of Working

Finally adopted required a long, flat ground-sluice, in which men, stationed at intervals, forked and wheeled away the rock, allowing only the finer gravel to pass off through a bedrock flume.

Being the possessor of a portion of this flat ground, I have been for a number of years experimenting with and perfecting machinery to do the work of removing rock from my ground-sluice, with the result of a machine, which, operated by a boy of 14 years, will do the work of half a dozen men with forks and wheelbarrows, and so effectively that a bedrock flume, with a grade of 1 inch to 12 feet, carries the tailings with ease which pass the machine.

Process for Working Flat Ground.

Owners of flat gravel mines may be interested by a description of my process of mining before the conditions of my ground would admit of a bedrock flume of even small grade. Commencing at my lower line, where there was an outcrop for only fine tailings at the creek level, some manner of mining was necessary in order to be profitable, whereby the water of the gulch could be made to hoist and wash the gravel at the surface until a point was reached above, where a flume of small grade would touch bedrock and have its dump near my lower line. For this purpose I constructed a machine, similar to the one now used for removing rock from the ground sluice, with the addition of an incline track and self-dumping cars to carry the gravel from bedrock to the machine. Using this machine, a pit 100 feet up the gulch, the width of the pay streak and to the bedrock (17 feet deep), was shoveled into cars, hoisted to the machine and washed, and the rock piled out of the way, the fine gravel passing off through a short string of sluices, possessing the same advantages for saving gold as undercurrents.

After clearing a pit as described, it served for impounding the tailings, which were ground sluiced nearly half-way to bedrock, from the top of a pit of equal area above. While filling the pit, the water from the ground-sluice passed off below through a box tail-race, with only half sufficient to carry clear water, and which also served as a drain. This box tail-race was made strong enough to resist the pressure of the overlying wet gravel, which was considerable while ground sluicing. It was laid to the head of each pit before filling, and the water let into it by a shaft, or monument, which was built up as filling progressed, so as to keep the sand and gravel from entering the tail-race. After stripping in this manner, the machine was moved up on the filled ground, and the remainder of the gravel shoveled into cars and hoisted as before, when the process of filling by ground-sluicing the surface from another pit was repeated.

A 12-foot overshot water-wheel, driven by 80 miners' inches of water, gave the power to hoist the gravel from bedrock, and to carry the washed rock from the machine back on the worked ground; the same water which furnished power for hoisting being turned on to the sluices between each carload to wash the gravel. Working by this method for several years, five men (one to tend machine and four to shovel) removed and washed 12,144 cubic yards of gravel each mining season, 135 days being the average season.

The Improved "Rock Separator."

Reaching a point on my ground where a flume was practical, my rock separator was brought into use. This machine is placed near the

ground to be mined, and at the head of a 30-inch bedrock flume having a grade of 1 inch to 12 feet. A movable flume, which can be curved to accommodate the ground-sluices above, and given sufficient grade, carries the heavy gravel to the machine, where the rock is separated and dumped automatically on either side of the main flume, forming a continuous pile as the works are moved up. My plan of working is to keep the ground-sluices V-shaped, with the point down toward the machine. While ground-sluicing is progressing on one side of the V, bedrock can be cleaned on the other. After ground-sluicing and cleaning bedrock on one side of the V, a low wall is built against the unworked ground, and the top from a diamond-shaped pit, extending from the central line of the gulch to one side, is stripped in the same manner as before described when the sluicing was done at the surface, the continuous pile of rock at the sides of the main flume restraining the tailings but allowing this water to pass off comparatively clear. This leaves a little over half of the bank to be ground-sluiced and separated by machine.

There is, without doubt, throughout the Pacific States and Territories, a large amount of ground which might be profitably mined by the use of one of these machines.

This machine for washing at the surface would be useful for river mining, being portable and easily gotten out of the way of a freshet; and on all flat mines where ditches are not already at hand to give sufficient head for an elevator, this machine could be made to suit the conditions, and used with economy. Every miner knows that

Long Bridges are Expensive

To construct and keep in repair; and then there is great loss of power in the use of the hydraulic elevator.

If I am correctly informed, it requires as many inches of water to do the lifting in an elevator as there is in the ground-sluice; and the best result obtained, the raising of gravel and sluice water one-fifth of the height of the head used in the elevator. During the past season, using a rock separator, which was built for trial, and was consequently very imperfect, it took from the ground-sluice all the rock which would not pass through a screen with one and one-quarter inch perforations, by the power given by a 12 foot overshot water-wheel, driven by one-seventh of the water used in the ground-sluice. All the fall required was given by the drop from the surface of the gulch to bedrock, and as a rule, the fall from surface to bedrock will give sufficient power with the given ratio of wheel-water to ground-sluice. Where mines are so situated as to give sufficient fall, the water-wheel can be set above the surface and power transmitted to the separator by wire rope belting, and the water again used in the ground-sluice.

A Suggestion to California Gravel Miners.

It is probable that a form of rock separator, suited to the conditions of the enjoined hydraulic mines in California, might be used so as to allow their being worked without injury to the agricultural lands below. The flume inside of worked ground might be heavily timbered and planked over, so as to make a sort of tunnel; then, by a separator at the head of the flume, rock taken from the ground-sluice might be dumped in such a manner as to form a restraining dam across the channel, back of which the top dirt from above might be dumped, and afterward the bottom gravel washed through a separator. It is probable that many of these hydraulic mines are so situated that the small amount of tailings which would pass a separator could be carried by a flume of light grade to a convenient place of impounding; or, by the use of a settler and a very small elevator, dumped above the filling from the top dirt, leaving the bulk of the water after passing the settler comparatively clear. In mines where there is cement carrying gold, the separator might be used at the dump of the flume, and the tailings carried to a place of impounding, as suggested before. Machines for separating the rock from the finer gravel, and used in such a way as to form restraining dams, will, in my opinion, be important factors in the working of these mines in the future. There are no difficulties, in the way of working without danger to agricultural lands, which engineers and inventors cannot overcome.

If Tailings Were Impounded

Outside of the channels of streams subject to freshets, and the water, after passing the restraining dam, was carried a short distance in a ditch, with little grade, so there could be no possible grounds for the assertion that "slickens" had escaped, it would seem as though there could be no legal obstacle in the way of working these mines without an Act by the Legislature. Without doubt the hydraulic miners of the enjoined districts feel sore from the defeat of the Walrath bill, but the fearful responsibilities required of the miners by that Act would, had it become a law, only have paved the way to litigation more disastrous to the miners than that which has passed. In the present over-sensitive state of the farmers, the defeat of the impounding bill has cheated the lawyers out of another rich harvest.

L. A. FENNER.

Virginia City, Montana, March 22, 1887.

The recent discovery of gold in paying quantities in Arkansas has caused much excitement, and the country is being flooded with prospectors and miners.

North Star Quartz-Mill.

A Splendid Establishment With All the Latest Improvements.

The new quartz mill of the North Star Mining Company, of Grass Valley, says the *Union*, has now been running about 10 days, and as it has been pronounced the finest gold quartz-mill in the State, and as some experienced mining men declare that it is the best mill of which they have any knowledge for its capacity, some items concerning it will not be uninteresting. The North Star Mining Company let the contract for building the mill to the Risdon Iron Works, of San Francisco, in September of last season; on the 28th of that month the contract for building and setting up the machinery was sub-let to W. C. D. Body, of Grass Valley, whose plans for the mill had been adopted by the company. Contracts were immediately made for the lumber to the amount of 300,000 feet, with Towle Bros. at Alta, and Geo. W. Whiteside, of the Eureka Lumber Company, and the mason work connected with the structure commenced. Within less than a week a considerable quantity of lumber was on the ground, and a large force of carpenters and other workmen busily employed. The weather continuing favorable, the large works were under cover before the winter rains came to interfere with operations, and the building was ready in advance of the machinery with which it was to be occupied. The mill is situated on the west side of the hoisting works and below the county road, and is attached to the hoisting works by a truss bridge which is nine feet wide and 60 feet in length, over which a car-track is laid with T rails, the full length of car-track being 100 feet. By means of this track the cars are run from the landing of the hoisting works into the top of the mill building where the ore is dumped upon inclined gratings (grizzlies) and descends into the ore-bins—the finer quartz passing through the gratings and the coarser going down to the rock-breakers, through which it passes into the bins underneath, from whence all the ore continues on down to the self-feeders which supply the batteries. The ore-bins are capable of holding 2500 tons of quartz, and are framed of heavy timbers, 14 by 14 inches, set on the bottom at an angle of 45 degrees. Below the bins is the battery floor, the dimensions of which are 40 by 75 feet, with room for eight batteries of five stamps each, but for the present, 30 stamps have been put up. The battery frame is of sugar pine. Below the batteries on the inclined floor are set sluices lined with silver plates. Below the battery floor is the concentrator floor, which is 40 by 86 feet, and on which sets 12 Triumph concentrators (two for each battery) which receive the pulp from the sluices above.

Adjoining this battery floor on the north is the cleanup-room, 20x22 feet, in which is laid a cement floor, and which contains all the conveniences for handling the amalgam and bullion. On the same level with the concentrator floor, on the north, is the compressor-room, 22x40 feet, and adjoining this on the west the wheel-room (in which are set three Pelton wheels), 16x22 feet. On the south of the concentrator floor is the snlpburet-room, 28x30 feet, with cement floor, sides and roof with glass sash. The whole interior of the mill is arranged in the most convenient manner, and all parts of the workmanship are very substantial. The list of machinery within the mill is 30 850-pound stamps, 2 rock-breakers, 6 shaking tables, 12 concentrators, 2 pans, 1 cleanup-barrel, 1 battea and about 600 feet of silver plate; of driving machinery, 1 air compressor and 4 Pelton wheels—one of 6 feet for battery, one of 6 feet for compressor, one of 4 feet for rock-breakers and one of 3 feet for concentrators—all run with cotton ropes of 1½ and 2 inches. The Pelton wheels take up but a small space, and a person not familiar with their capacity would be surprised at seeing so large a quantity of machinery driven by these little wheels. In the hoisting works, heretofore driven by steam-power, two Pelton wheels have also been introduced—one of 6 feet to do the pumping and one of 5 feet for hoisting. The Pelton wheels were all manufactured at the foundry of Geo. G. Allen, of Nevada City, while the mortars and stamps and other iron-work were from the Risdon Iron Works, San Francisco. By the arrangement of the mill the distance from where the ore is dumped from the cars until it is discharged as pulp from the concentrators is about 90 feet. The crushing of the ore is done automatically, and is not handled after being dumped except at the rock-breakers, which are attended by two men at daytime only. By this means seven men are sufficient to run the mill in 24 hours, during which time the mill is expected to crush 75 tons of ore, the cost of the reduction of which should not exceed 50 cents per ton, and possibly may not reach that.

As stated above, this is considered the best gold-saving mill in the State, being strong and well finished in its construction and admirable in its arrangement for convenience in handling the ores, and doing all the other work, and is every way creditable to the enterprise of the company in providing so excellent a plant, and to Mr. Body, the designer and builder, whose work has been highly complimented by all who have viewed and examined the mill. The cost of the mill has been about \$50,000.

The United Nickel Company of New York has secured the C. P. R. R. for using its patent process of nickel-plating metals.

The Potter Process.

Working Dry or "Refractory" Ores.

A new smelting process invented by James A. Potter, of Chicago, is talked of as being tried in Idaho. Chas. E. Baldwin, of Minneapolis, and W. D. Pinkston, of Shoshone, Idaho, have bonded the patent, they to organize a company and put up a plant. The details of the process as given in the *St. Paul Globe* are as follows:

The Potter process can be applied to any smelting furnace. On either side of the base of the furnace are two tanks or reservoirs, which contain molten lead. The furnace stack is tapped just above these tanks and the mixture of precious and base metals floats over the lead. As the lead unites with the precious metals below, a shower-bath of molten lead is thrown from above, making the union more perfect. This molten alloy of lead and precious metals is used for the shower-bath over and over again, by means of force-pumps; while the base metals are floated off. When the lead has taken up all the gold it will contain, it is very rich indeed, a ton being worth \$10,000 to \$12,000. This is the advantage of the process. No matter what the condition of the ores, whether rich or low grade, dry or refractory, the operation is the same, and the same result is reached. And instead of shipping away (as at present) an alloy worth \$150 a ton, the base bullion is worth \$10,000.

The value of the Potter process, says the *Globe*, is two-fold: First, in saving the expense of freight on base bullion and in getting lead; second, the large saving in getting the additional percentage of the precious metal locked up in the ores. If, for instance, ore should assay \$100 to the ton, not more than 70 per cent is saved in smelting by the old process; while for the Potter process is claimed a saving of at least 95 per cent.

Commenting on this statement, the editor of the *Wood River Times* says: The *Globe* was misinformed as to the percentage of loss in the present process of smelting. Ore-purchasers for smelting purposes buy on the basis of 90 per cent of the lead and 95 per cent of the silver contained in the ores. That is to say, if ore carries, say, 100 pounds of lead and 100 ounces of silver per ton, the seller gets paid for 90 pounds of lead and 95 ounces of silver, less the freight and smelting charges.

The *Globe* states that "one of the officials of the Potter Company is prospecting through Montana to select a site for the location of a plant." That is entirely unnecessary. If the process does what is claimed for it, the Wood River, Salt Lake, Reno, Portland, or Denver smelters will doubtless be glad to adopt it; and the *Times* advises the company to quit "prospecting" for locations and come here at once. There are four smelting furnaces at Ketchum, one at Hailey, and one at Bellevue, the owners of all of which will doubtless be glad to assist the company in introducing its process, if they can be assured that it is of any account.

The Plymouth Consolidated Mine.

The Plymouth Consolidated Gold Mining Company has issued its fourth annual report, from which we take the following figures:

This company was formed June 1, 1883, by the consolidation of the Empire, the Amador Pacific and the Plymouth companies. The mines were well developed, and a considerable amount in dividends had been paid. Prior to the consolidation, gold bullion to the amount of about \$2,500,000 had been produced.

The following is a statement of all the receipts and expenditures of this company from its organization, June 1, 1883, to January 1, 1887, a period of three years and seven months.

June 1, 1883.—Cash on hand at time of organization of company.....	\$ 153,319 80
Gold bullion produced by the mines.....	3,068,194 69
Disbursements:	
Operating expenses.....	1,144,699 82
Construction since June 1, 1883.....	170,764 78
Thirty-one dividends.....	1,825,000 00
Cash on hand January 1, 1887.....	81,079 89

During the year both mills have been run with regularity, crushing in the aggregate 101,315 tons of ore. The average yield of gold was \$6.18 per ton.

In accordance with the policy announced at the beginning of the year, most of the rock used was of low grade and taken from the upper levels; the better class of ore, and which composes the deep levels, being reserved for future use. The Empire mill has been supplied with rock from above the 900-foot level. Nearly all the rock crushed by the Pacific mill came from between the 900 and 1300-foot levels.

The cost of production was as follows:

	Per ton.
Mining.....	\$2 18
Milling.....	39
Saving and reducing sulphurets.....	37
General expenses—office, taxes and prospecting.....	11
Total average cost, including all expenses.....	\$2 50

This mine is fully developed with large reserves and is now paying larger dividends than any other gold mine in North America. The mines are said, officially, to be looking better than at any previous period of their history, and the company has the largest quartz mill in the world, with a single exception. The stock is selling at about \$1,650,000.

Railroad Rates.

Freights and Fares Under the New Law.

Pacific Coast producers and shippers have been on the anxious seat ever since the enactment of the Interstate Commerce law as to what the immediate effect would be on rates to and from this coast. The *Morning Call* of March 30th gives the following full information on the subject:

The new western classification by which freight rates are to be permanently regulated after April 4th next came to hand yesterday, and railroad agents are at last in a position to give reliable information in regard to tariffs as they will be under the Interstate Commerce bill. The tariff schedule received last week was simply the first rough division of the various kinds of freights into some ten classes, running from one to five and from A to E, stating also the rates which were to be charged for each class. The new sheet, however, deals directly with the freights themselves without regard to their prices, and, with the old sheet as a basis, completely reclassifies them under the heads from one to five and from A to E. When a merchant, for instance, desires to know at what figure he can import hams and hocks from Missouri-river points, he simply turns to the schedule, and under the appropriate head finds them rated in the second class for lots less than a carload, and in carload lots and over in the fifth class, the rate in the first instance being \$2.50 and in the second \$1.50. This classification, however, only applies to those classes of freight for which no special rates have been made. In the transportation of beans, canned fruits, etc., for which freight the Pacific Mail competes strongly, special rates have been agreed upon as follows:

ARTICLES In carloads of 20,000 lbs., per 100 lbs.	To		
	Missouri River and Common Points.	St. Louis and Common Points.	Chicago and Common Points.
Beans, canned fruits, pickled fish, canned salmon, honey (strained).....	1 40	1 50	1 55
Borax, cocoon oil, whale and fish oil, vegeta- bles.....	1 10	1 20	1 25
Barley.....	05	72	75

Hops, any quantity, from the Pacific terminals named above, to Missouri-river common points, \$1.75 per 100 lbs.; to St. Louis and common points, \$1.85 per 100 lbs.; and to Chicago and common points, \$1.95 per 100 lbs.

Oranges, in car-lots, from Los Angeles, Cal., to Missouri-river points, \$1 per 100 lbs.; to Sioux City, Iowa, and St. Louis, Mo., and common points therewith, \$1.10 per 100 lbs.; and to St. Paul, Minneapolis and Chicago, \$1.15 per 100 lbs.

This last rate differs but slightly from that made under the old regime. The old rate to Chicago was \$1.05, so that there is only here an increase of 10 cents. To Denver the rate is lower by some 40 cents, the rate having previously been \$1.40, where it is now \$1.

San Francisco merchants have awaited with much interest and anxiety the issuance of the new local rate-schedule upon which the officials of the Southern Pacific have been working most assiduously since the return of J. C. Stubbs and Richard Gray from Chicago. It will be a decided relief for them to learn, therefore, that the interstate-law does not alter, save in a few unimportant particulars, the present relationship between the Missouri river and California in respect to Salt Lake City and Ogden.

In reference to the maintenance of the existing trade of California and Colorado, the following special rates for California products have been made from Pacific Coast terminals to Denver, Colorado Springs and Pueblo:

C. L.	Per 100 lbs.
Beans.....	\$1 30
Canned goods.....	1 30
Fish, pickled.....	1 30
Lumber.....	64
Oranges.....	64
Sugar.....	1 30
Vegetables.....	1 00
Wine.....	1 30

For freight train service rates on live-stock between Pacific Coast common points and the places in the table, rates have been agreed upon as follows:

	Length of Cars.	Rates in dollars and cents per 1000 pounds. Minimum weight per car, 2000 pounds		
		Horses and Cattle.	Sheep.	Hogs and Pigs.
Missouri river common points, also St. Paul and Minneapolis, Minn., and Galveston and Houston, Texas.	30 ft. 2.00	1.50	1.40	
	33 ft. 2.20	1.65	1.54	
	34 ft. 2.27	1.70	1.59	
	35 ft. 2.33	1.75	1.63	
Mississippi river common points, Dubuque, Ia., to New Orleans, La., inclusive.	30 ft. 2.22	1.70	1.60	
	33 ft. 2.42	1.87	1.74	
	34 ft. 2.52	1.92	1.81	7-10
	35 ft. 2.60	1.98	1.86	3-10
Chicago, Milwaukee and points common there- with.	30 ft. 2.30	1.77	1.65	
	33 ft. 2.53	1.95	1.81	
	34 ft. 2.61	2.01	1.87	3-10
	35 ft. 2.68	2.07	1.92	2-10

Another table of considerable interest to both importers and exporters is the table of rates between Missouri-river points and Chicago and St. Louis, which is as follows:

	First Class.	Second Class.	Third Class.	Fourth Class.	Fifth Class.
Chicago.....	\$20	\$15	\$10	\$5	\$30
St. Louis.....	70	55	40	30	25
	A	B	C	D	E
Chicago.....	\$32 50	\$25 50	\$23	\$20	\$10
St. Louis.....	25	22	15	15	12

As far, therefore, as can be judged from present indications, the whole effect of the interstate-commerce bill on California freight has been to increase materially rates to Missouri river points and points east thereof, while the rates to local points, though increased, have yet been maintained in much the same relation to those ruling to the same points from the East as in the past.

T. H. Goodman, in conversation yesterday with a *Call* reporter, reiterated his former statement that passenger rates would remain much the same as they are at present. There may be, he said, a few changes to points west of the Missouri, for if any of our connections increase their rates a few dollars, we must make a similar change in our rate schedule. We will issue a new rate-sheet, however, on the 4th prox., but beyond such changes as may occur between now and then it will be substantially similar to that in use at present. In regard to excursions, Mr. Goodman stated that they would be continued at the same rate as at present, namely, \$80 for the round trip from Chicago to the coast, and \$60 from Missouri-river points, tickets to be good for six months.

British Columbia and Alaska.

The fact that gold has been discovered in several places in Alaska brings into prominence the question of the boundary line location between that Territory and British Columbia.

The line was strictly defined, so far as bearings are concerned, in the treaty documents that conveyed Alaska to the United States. This definition is similar to the points specified in 1825 by the Governments of Great Britain and Russia.

The peculiar manner in which the line intersects the Territory has formed a source of annoyance to miners and prospectors since 1870, and they have never been sure of their rights to any find in the district bordering upon the inland seas of the southeast portion of the Territory.

The situation of the new placer diggings on the Stewart river is probably in British territory. But to reach the location miners have to pass through a portion of the country claimed by the United States. No matter whether they proceed to the scene by the way of Juneau in the south or via St. Michaels to the Yukon river in the north, they must pass through United States territory. As long ago as 1870 the Hudson's Bay Company were occupying Fort Yukon, within the United States boundary line, but they speedily vacated the post when notified of the position. The rush to these Stewart-river diggings during the past winter and the coming summer has been and will be large. In 1886 three men brought over \$8000 worth of gold dust and small nuggets to this city, and now there are reports of new finds.

There is a steamer pumping on the bars of the small stream that serve as feeders to the Yukon below Fort Reliance, at which point the boundary line intersects the Territory on its track northward. It is the intention of one of the owners of this steamer to leave for the Yukon river in May, taking with him pumping apparatus and supplies.

The settlement of the boundary-line question will doubtless attract the attention of the Canadian Government at an early date, but other than levying a license tax upon the miners and requiring the payment of custom duties upon supplies, there is no probability of any serious trouble arising upon the rights of miners to work on British soil.

WOOD COMPRESSED IN MINES.—Many beautifully polished specimens of pine wood mentioned by the *Enterprise* a few days ago as having been taken from the 1500 level of the Consolidated California and Virginia mine are now to be seen about town. The wood having been compressed to one-fourth its natural size, is as firm and close-grained as boxwood, therefore it takes a fine polish. When it is polished it looks and feels exactly like petrified wood, and it is mistaken for such by all who see it for the first time. The specimens when polished are of a deep chestnut color. Though this wood was brought up to its present condition by exposure to 160 degrees of heat under immense pressure for a period of 12 years, it is thought the same effect might be produced in a few days by means of proper apparatus and appliances. A man who yesterday made the experiment says the compressed pine burns longer than coal.—*Virginia (Nev.) Enterprise*.

OWENS LAKE.—The *Inyo Independent* says: Up till the present time a large force of men and horses has been kept at work at Owens Lake, making pools or ground tanks for the evaporation of the lake water. It is said that as many of these tanks are now ready for use as will be wanted for some time, and that the working force will be reduced to what is needed to attend the pumping machinery and keep the tanks filled. Another experiment is about to be made in evaporating the water. An evaporator the length of a flat car has been sent to the lake, and this will be tried in comparison with the ground tanks.

Water-Power for Mining.

The introduction of water-power into the Grass Valley district for the purpose of operating the machinery of the quartz mines is working a revolution in favor of that industry, which will eventually be doing more good for the development of quartz mines in the next few years than in all the previous history of the district, as it gives a cheaper power than by the use of steam, and greatly reduces the expense of bullion production. One of the great items of expense in mining is the pumping that is necessary to be done, and along with the cost of steam machinery is the heavy and continuous cost of fuel, which is the formidable item that makes a heavy draft upon the exchequers of individuals or companies that undertake the opening of mines. A plant for water-power is not necessarily costly, and the saving in money over the use of fuel can safely be estimated at 33 per cent, which in many, and probably most instances, would be the difference between the success or failure of a mining enterprise—as while a mine would be worked as long as it paid but a small margin of profit, it would not be if the loss was a little the other way, but continuous. By the use of water, it can be, according to locality, used over several times, thus minimizing the cost and reducing expenses to such figures that very low grade ores can be worked to a profit, that otherwise must be left untouched. At the present time about 800 inches of water is being used in the district, supplied by the South Yuba canal, driving machinery under heavy pressure; other mines are preparing to obtain power from the same source. The Canal Company thus secures a constant and reliable market for its water, which can be taken to every mine in the district whether at present in operation or to be worked in the future. This advantage is so manifest that a number of mining properties, heretofore partially developed, but now idle because they could not be worked cheaply, will be revived, and become as reliable gold-producers as any of the past or present day. This is so manifest that the people of the district have full confidence in the future of the mining business, and properties are held at firmer stated valuation than ever before. The Grass Valley quartz district will continue in the lead in this State, as it has always been before, and a cheap water-power will enable it to maintain this position.—*Grass Valley Union*.

Shasta County Mines.

In an article on the resources of Shasta county, the *Shasta County Democrat* has the following to say of the mines: Our mines are of great importance. There is more wealth in them than in any of our resources, yet, our people who have the means to assist in developing them, let fortunes slip their grasp. To illustrate: Three years ago we could not convince our townsmen, who had means, that Old Diggins district possessed valuable mining property. Our own people scouted and were skeptical. What's the result? Thanks to Bell, Hopping & Co., and others, they persevered. Their perseverance attracted the attention of mining men from a distance. The old Central was sold for a song, and the new owners have refused \$100,000 for the property and are eager to purchase more claims surrounding this mine. Our townsmen who had the means would not touch the Squaw Creek mines. What's the result? Outside capital purchased the mines, proven to be valuable, and Jack Conant, who three years ago was so poor that he was barely able to purchase a sack of flour, to-day owns a fine mine, a fine mill, has his pockets lined with money, sports fine clothes and a plug hat. Outside capital purchased the Muchmore from under our noses. Outside capital purchased and seems to develop all the mines that are being developed, while our own citizens of means (save a baker's half dozen) squeeze the eagle for one per cent, and deny the honest, hard-working prospector a grub-stake. Our mountains and mining camps are full of good prospects. All our mines that are being worked are yielding large profits. What we need is a confidence that will impel our own folk to take hold and assist those that have prospects worth working. Open the mines, then capital will purchase. Wood and water are abundant. Quartz veins that prospect well in gold are actually numerous; all the outcroppings, conditions and formations are good. Seeing and knowing of the existence of these things, it is ample evidence to us that our undeveloped mining resources are simply wonderful.

THE LICK FREE BATHS.—Ira P. Rankin, one of the members of the sub-board of Lick Trustees, has made a statement to the effect that it is the intention of the board to have the free bath provided for in the will of James Lick ready for the use of the public in a short time. The plans of the baths have long been completed and a lot at the corner of Tenth and Howard streets was purchased for the purpose, when a suit against the property was commenced. The board, not wishing to encourage the scheme, has remained inactive until the suit could be settled. There is every probability of the suit being dismissed in a short time, and as soon as it is, work on the baths will be commenced.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

WASH-BOILER.—Hiram H. Tuttle, S. F. No. 359,650. Dated March 22, 1887. This invention relates to that class of wash-boilers in which a circulation of water and steam is obtained by means of vertical tubes. The invention consists in a combination of devices. The object is to provide a wash-boiler in which the circulation of water and steam shall be general and perfect.

PUMP.—L. L. Bettys, Mountain View, Santa Clara Co. No. 359,764. Dated March 22, 1887. This submerged or deep-well pump consists of a cylinder receiving water through independent ports—one on its base and the other in its side—a double plunger having one of its heads solid, and adapted to operate in connection with the lower entrance port of the cylinder, and its other head hollow and provided with a valve, said head being adapted to operate in connection with the side entrance-port of the cylinder, a side pipe in communication below with the base of the cylinder and with the discharge pipe above, a valve controlling the entrance to the side pipe, a valve in the cylinder controlling its communication with the discharge pipe, and various details of construction.

LIFE-BOAT.—Augustin Battard, Santa Rosalie, Lower California, Mexico. No. 359,762. Dated March 22, 1887. This improvement in vessels is specially applicable to life-boats and those that are exposed to heavy seas or surf. It consists in the combination, on a boat, of one or more cylindrical or conical drums or chambers, having axes upon which they are loosely journaled above the center of gravity of the boat, so that they may act to keep the boat in an upright position, or to immediately return it to that position if it should be upset by the violence of the waves. By being loosely journaled, as described, the blows or force of the waves or surf will be greatly lessened when they strike the boat with violence. By having these buoyant hollow floats above the center of gravity, if the boat is upset in the breakers or waves, it will be turned upright again when the wave has passed.

THE TIME TO MOVE.—Now is the time for the miners to begin the development of their claims. The season is opening up favorably, and time should not be lost in idling about waiting for some one with capital to come along to buy mines at fabulous prices. If you have a good mine, show your faith in it by working it yourself, if possible. If you are unable to work it yourself, take a reasonable price for it when a buyer comes along. It is far better for a poor man to do this than take the desperate chances of getting a high price. Many times prospectors have been offered prices which to them seemed low, but which, in reality, were moderate. They held out for large prices, and to-day many of the same men regret their failure to sell at the prices offered. If you cannot operate your mine yourself, sell it when a reasonable sum is offered, and the chances are that you will be much better off by so doing.—*Greenview (Plumas Co.) Bulletin*.

A CORNER IN SALT.—It has been generally known for weeks that a quiet yet strong effort was making to have all the saltmakers lease their ground to a syndicate for a term of five years. The business was finally concluded this week. From all we can learn we are satisfied that it is a good thing for the salt-men. This syndicate is composed principally of the American, Union Pacific and Carmen Island Salt Companies, D. F. Bartou and Plummer Bros. But the "big fish" are the three companies above mentioned. About 21 salt-men being the full number, have agreed to the syndicate proposition. It now remains to be seen whether the syndicate will remain a "happy family" for five years to come. We earnestly hope so. Salt is liable to jump to \$5 per ton before many weeks. Now is the time to lay in a supply.—*Haywards Journal*.

SANTA BARBARA PRESS: Dr. Walker Fuchs, the prominent scientist, who is now making deep-sea soundings in the Santa Barbara channel for the Agassiz Association, has just returned from a trip to the islands. He reports that he found there a cave which greatly resembles the celebrated "Blue Grotto" of Capri, only far more beautiful.

DURING the year 1886 the bullion and mineral product of Socorro county, N. M., reached the sum of \$2,632,133.41. In the year 1882 the county made no output. These figures alone should indicate to an unbiased mind that New Mexico possesses strong claims upon the attention of mining men and capitalists seeking legitimate investment.—*Socorro Bulletin*.

THE Mount Cory people are thinking of putting concentrators in the big mill before starting it. Until they decide whether they want concentrators in the mill, or a small mill and concentrators near the mine, they will do nothing toward reducing the ore which they now have.—*Silver State*.

TELEGRAPHY IN CHINA.—It is stated that the Marquis Tseng, who has lately returned to China from his long residence as representative of that empire in London, has signified his arrival in his native country by earnest endeavors to have a line of telegraph completed between Peking and the most important centers in China. He has submitted plans prepared by competent men to the Imperial Government, and it is expected that these will shortly be accepted.

The Late Dr. Kellogg.

Dr. Albert Kellogg, the last one of the charter members of the California Academy of Sciences, died at his residence in Alameda on Friday last, in the 71th year of his age. Dr. Kellogg was one of the best known scientists on the coast, having devoted himself to botanical research in this State for the last 30 years. For the past three or four years he has been working at the Academy on a small salary derived from the Crocker Scientific Investigation Fund—money donated by Charles Crocker for the assistance of those persons who, by their devotion to scientific pursuits, have incapacitated themselves from following ordinary avocations. Dr. Kellogg has devoted a great deal of his time of late years to investigation of the Pacific Coast forest trees, on which subject he was an authority.

As one of the earliest workers in botany on this coast, he found a wide field for research, and has described hundreds of new species from time to time. The results of a great deal of his work have appeared in the published proceedings of the Academy. A large amount of MSS., however, is still unpublished. He has in his day traveled all over the coast in his botanical trips, but for the past few years physical infirmity has prevented active field work.

Dr. Kellogg was one of the most simple-minded of men, thoroughly devoted to his chosen branch of science, and utterly regardless of all pecuniary rewards. Gentle in manner, unselfish and pure in thought and deed, he endeared himself to all with whom he came in contact. He was always willing and pleased to assist students and investigators of less experience. His was an exceptional character in many respects. Leading an uneventful and quiet life, and pursuing his favorite study, he passed his days free from all the worries of a money-getting career. An enthusiast in botany, and a man of close observation, it is no wonder that he accomplished a vast amount of good work in his time. The Academy of Sciences loses one of its most valued workers, and one who was thoroughly devoted to its interests.

At the meeting of the Academy on Monday evening, an adjournment was taken out of respect to the memory of Dr. Kellogg. A committee, consisting of Dr. Geo. Horvath, E. L. Greene and Dr. H. Behr, was appointed to prepare suitable resolutions, to be read at the meeting of the 18th inst. Memorial services will be held on Sunday, April 10th, in the Swedenborgian church, in this city.

In this connection it may be stated that through the suggestion of ex-President Geo. Davidson, of the Academy, a lot will be purchased in the cemetery at Oakland and laid out to receive the remains of deceased scientists, in case no other provision has been made for them. Capt. Kohl, of the Alaska Commercial Co., has already donated \$100 for the purpose.

The Sutro Tunnel.

At Carson, Nevada, on the 4th inst., the Sutro Tunnel Company, through its attorney, Theodore Sutro, applied to the United States Circuit Court, of Nevada, for leave to amend the answer in the foreclosure suit brought by McCalmont Bros. & Co. against it, by presenting additional defenses. The application was filed by Theodore Sutro and Col. M. N. Stone, on behalf of the company, and resulted in an order from the court granting to the Tunnel Company leave to amend, and 40 days' time within which to take further testimony, and 40 days additional for the plaintiff to take testimony in rebuttal. The court also ordered that the receiver pay to the plaintiff the money in his hands, without prejudice to the defense, retarding \$25,000 for contingent expenses, thereby avoiding the loss of interest to the company. The rulings of the court are an important gain to the company.

In this connection it may be stated that the Virginia Enterprise says that the Sutro tunnel, which was formerly controlled by the McCalmont Brothers, the bankers of London, and who hold the mortgage on the company's property and franchise, has now passed into the hands of the stockholders in New York City, by the election which took place Monday, March 28th. The suit now pending against the property in foreclosure will probably be withdrawn or compromised by the payment of the amount due the McCalmonts, of London, and

the property, which is now yielding a monthly income of about \$30,000, with the prospect of being largely increased, is expected to place the company on a paying basis.

Mending Cables.

All the great Anglo-American Telegraph Companies keep a neat little steamer for cable-repairing purposes. When a break or defect in the cable occurs it may be discovered from the shore station, and located within a few hundred yards by the skillful electrician. The little

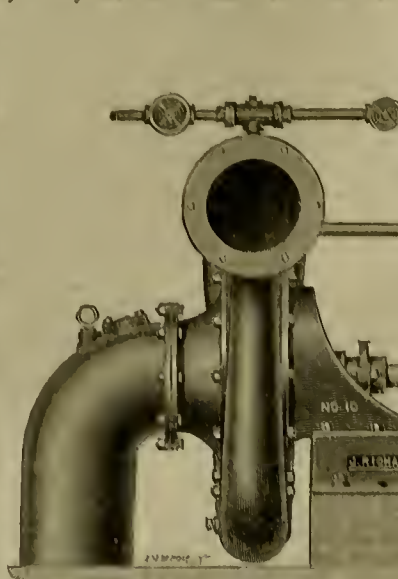


Fig. 3. RICHARDS' COMPOUND CONDENSING ENGINE AND DRAINING PUMP.

steamer is then sent out to repair the fault, and sails to within a half or three-quarters of a mile of the break. A strong hempen rope, wire-strengthened, is then let down with a large grapnel at the end. This grapnel has four hooks, at the base of which is a small iron pin about a half-inch in diameter, which is pressed in when the weight of the cable comes upon

Richards' Patent Hydraulic Machinery.

NUMBER 2.

Fig. 3 of the accompanying engravings shows a steam centrifugal pumping engine.

These engines are of the compound type, having a trunk-piston reducing the acting area of one stroke to one-half that in the other, the steam being transferred from one side to the other and used twice, the same as in the case of two cylinders, the valves and ports being arranged with proportions corresponding to volume of steam at the different pressures.

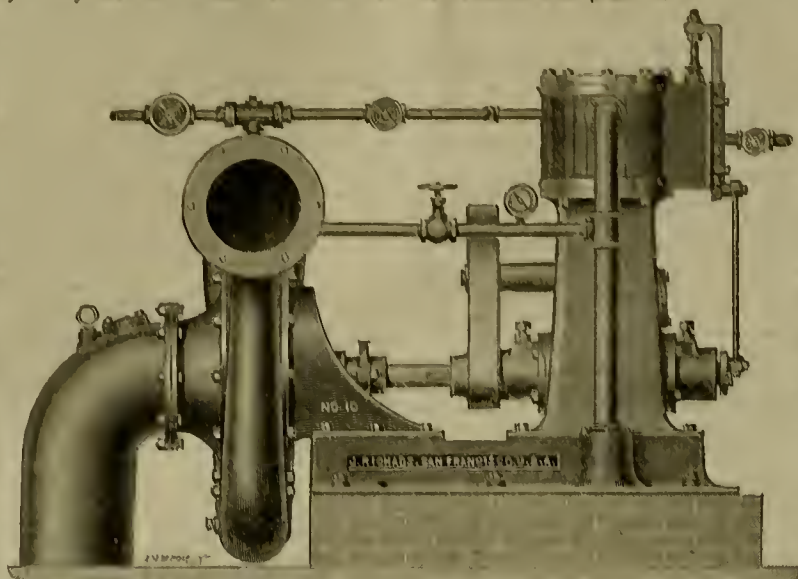


Fig. 3. RICHARDS' COMPOUND CONDENSING ENGINE AND DRAINING PUMP.

This method of working is not new. It has been applied to at least one steamer on this coast, and has been carried out in some successful-working engines made at the Richmond Iron Works, in this city. The new features of the present engines consist in the method of their construction, the working parts being lashed in the main framing to secure lubrication, as in

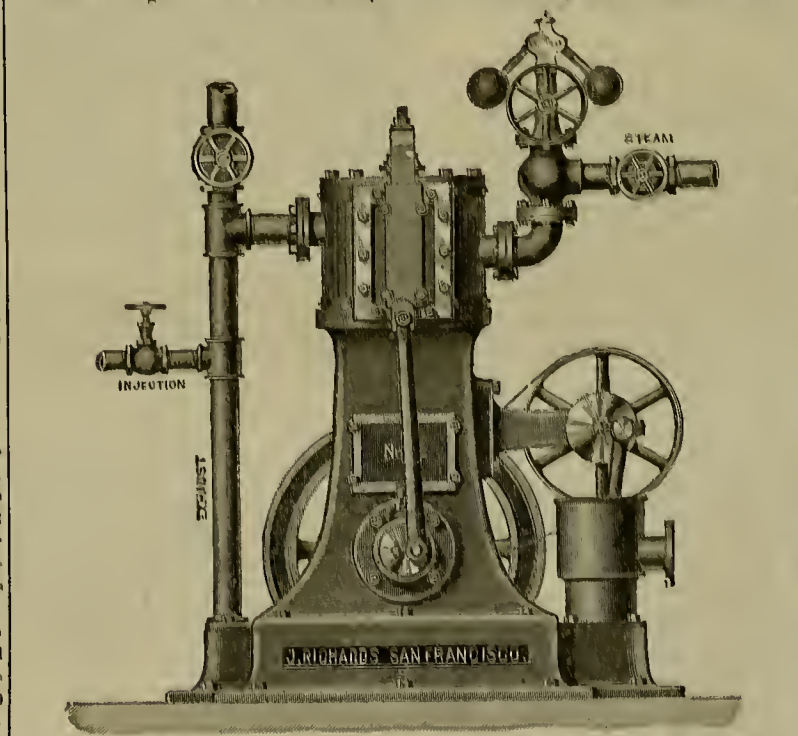


Fig. 4. RICHARDS' PATENT COMPOUND CONDENSING STEAM ENGINE.

it; this pressure closes the circuit in a small wire in the center of the grapnel, ringing a bell in the electrician's office. When the light of the cable has been hooked it is pulled to the surface, with greater or less difficulty, according to the depth of the water. It is then cut and the end set in a tablet in the office of the steamer, so that the electrician can test it, let us suppose, first to the westward, and finding that he cannot reach the shore in that direction, he then tries it in the opposite direction and locates the break exactly. The shore end is then lowered and the cable is pulled on the deck of the vessel, by means of an engine connecting with a great drum, and when the fault is discovered it is cut out and spliced and then paid out into the deep.

the case of Mr. Richards' and other single-acting engines, in a new form of connecting rods, and the condensing apparatus by which is secured a vacuum duty on the large or low-pressure piston.

The arrangement in connection with a centrifugal pump shown in the drawing is exceedingly compact and simple, dispensing with most of the foundation work usually required.

The condenser is in the sole plate and the air-pump behind the engine in the present view. Condensing apparatus is desirable in cases where continuous duty is required and where fuel is dear. It is attained here at moderate expense in first cost and without loss of room.

Fig. 4 is a front view of one of the engines just described, showing air-pump and other details.

Foundry Notes.

At the Golden State and Miners' Iron Works they are building one of J. B. Osborne's steam wagons of the pattern which we described in the Press of Nov. 20th last, page 38d. The new steam wagon is for use on the Mojave desert to haul ore from mine to mill, a distance of nine miles. The boiler on the machine is of locomotive pattern, and the two engines have 61-inch cylinders, 12-inch stroke. They are geared to make 30 revolutions to one of the main driving-wheels. The main driving-wheels are 6 feet in diameter and 14 inch face. The steering is done by steam. The traction engine is about 25 feet long. It carries its own coal and water. The machine is intended to have a train of four wagons each with 25 tons of ore. Each wagon has a separate engine, furnished with steam from the main boiler on the forward engine. The main wagon weighs, loaded, 22 tons, and each cart 30 tons when loaded.

The following is a brief statement of the machinery which has recently been furnished by the Joshua Hendy Machine Works: One double circular sawmill complete with necessary steam-power for use in Shasta county; one outfit for sawmill, and required steam-power also, shipped for use in the same county; one complete hydraulic plant, consisting of a 20-inch hydraulic gravel elevator, necessary hydraulic pipe, water-gates and flants for hydraulic mining in Shasta county. It may be here stated that, although our journals teem with accounts of the "boom" which has overtaken the sunny southern portion of our State, and in which we, of course, rejoice, yet it will be found that even that portion of our State which we have been led to consider as the frozen north is performing its own good work in contributing to the channels of foreign and interstate commerce the usefulness of its vast forests and the wealth of its mines.

The same works have also just completed and shipped a complete hoisting and pumping plant for use in Inyo county in developing a mine belonging to one of the distinguished candidates for the Democratic nomination in the last gubernatorial campaign. They have further furnished for the Fort Shasta Lumber Co., a battery of five steel boilers of the best form of construction and fully equipped with the latest improved fittings. They have also furnished to the Lighthouse Department of the 12th District, under the able supervision of Captain A. H. Payson, Corps U. S. Engineers, one boiler and fittings for Point Montara, boiler for Point Reyes and a boiler and log-saw engine for Verba Buena Island, all of which were constructed under specifications from the U. S. Engineer's office and subjected to Government inspection and duty accepted. They have supplied for the use of the cannery at Astoria, Oregon, under the management of Messrs. W. T. Coleman & Co., a large and complete boiler. They report the sales of several boilers and engines for use in the Southern counties, and that their business in the special manufacture of automatic ore feeders and Triumph concentrators, and sales of same, have been exceedingly good, and large orders have been filled and are in hand for Idaho, Montana, Dakota, New Mexico, Mexico and our own State of California.

Having recently accepted the agency for the sale of the celebrated hand-log sawmills manufactured by Messrs. Smith, Myers & Schinner, of Cincinnati, Ohio, they have entered into a contract with J. P. Pierce, Esq., manager of the Pacific Mills Lumber Company, of Pacific Mills, Santa Cruz county, for the furnishing for the use of that company of one of their largest size of hand-saw mills, and when it shall have been received and placed in operation the agents extend a cordial invitation to those who are interested in sawmill or lumber enterprises to visit and examine this mill, which is believed to be superior to any other similar form of mill yet placed in operation in our State.

SILVER MINERS are anxious to know when the "bottom notch" for silver will be reached. A short time ago it was over 100, and now it is down to 93½ per ounce. For value is supposed to be \$1.20. With the present heavy discount, considerable loss is entailed on all silver producers.

Entrepreneurs have discovered some rich ore in Summit canyon, Nye county, Nev.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO:

Saturday Morning, April 9, 1887.

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See Advertising Columns.

Passing Events.

This week the railroads began work under the Interstate Commerce law, concerning the probable effect of which on our industries on this coast there is so much difference of opinion. The through freight rates have been raised considerably, as shown by an article on this subject in another column.

The rain which fell on Wednesday seems to have been experienced over a large area in California, and has done a great deal of good. There has been some fear that lack of late rains would be detrimental to the crops.

Spring has now fairly set in, and we hear from the interior that prospectors are again out in the hills.

The Gold Belt mines up in the Wood River region, Idaho, are commencing to attract considerable attention. A number of good mines have been opened.

Alaska mines are again alluring prospectors to that far-off region. The Yukon and Stewart River countries will be pretty well prospected this year. Reports of very rich finds prevail, and numbers of miners are going to try their fortunes this summer in Alaska.

Interstate Commerce and Ore Shipments.

The statement is being printed in some of the interior papers of this State that the operations of the Interstate Commerce law will cripple mining where ores have to be shipped from or through one State to another. And it is stated that this will stop "chloriding," and injure also men who are working small ledges and shipping their ore.

These statements need modification. In fact, they may be said to be entirely incorrect. We have made inquiries on the subject, and find there is to be no advance at all, as far as the railroads terminating in this city are concerned. On the contrary, the railroad managers are disposed to reduce the rate on ores as far as possible. At present they will keep the special rates heretofore given on ores, bullion, concentrates, etc.

It may not be generally known that when concentrate first began to be shipped by rail the roads charged higher rates on them than on ore, as they were the product of rich ores. But now that systems of concentration are in such general use, and low-grade ores are concentrated, which as ores could not be shipped, concentrates are rated the same as ores and are so named on the shipping list.

As far as the ores, etc., from Nevada, Arizona and other States and Territories are concerned, those who receive them here are satisfied that the same policy will prevail with the railroad company as was the case before the Interstate Commerce Act became the law. The railroad company now fully realizes the importance of encouraging mining developments in the different portions of the country, and show the industry all the favor that they can.

There will naturally be some changes in the direction in which ores are shipped. The operations of the law will be rather favorable to California than otherwise. Heretofore the Omaha smelters have received very low special rates from the Union Pacific railroad and connections, which enabled them to take certain classes of ores to the other side of the mountains, and at the same time they had the rates put up on ores coming to California, so as to drive them the other way. Now the operation of the new law will make rates uniform each way, and a great deal of ore will come to San Francisco to be worked which formerly went Eastward, the distance here being shorter. This will widen the scope of operation for California considerably.

Inquiry of Mr. Ralston, president of the Selby Smelting Works, the largest establishment on the coast, shows that these views are held by their company. In view of investigations made by them on the subject, they are satisfied that the results of the workings of the new law will be favorable to metallurgical operations in California. At any rate, they are so far convinced that they are now extending their facilities and putting up new furnaces to accommodate the increased business. They say the railroads are now disposed to encourage mining, and the output of the coast mines will be increased, so that the company are obliged to increase their facilities to treat all the ores that come.

Ore and bullion shipped to many points east of the mountains, heretofore, will now come in this direction on account of the less freight for the shorter distance.

SUGAR AS BOILER-SCALE PREVENTIVE.—M. Palto, an Italian officer, has found that the addition of two kilograms of sugar to the water in a tubular boiler of 126 tubes effectively prevents the formation of an incrustation, and at the same time removes incrustations which have been previously formed. It should be noted, however, that sugar, at the temperature corresponding to four or five atmospheres, rapidly gives rise to the formation of acids, notably formic acid, and these acids energetically corrode the boilers. For this reason the use of sugar as a disinfectant should be avoided.

THE Esmeralda News is informed of the sale of the Sweetwater mines. The new owners are Chicago capitalists, and intend spending a considerable amount of coin in building a mill suitable to crush the ore and to start the mines in full blast.

WORKMEN at the Reno reduction works are suffering from lead poisoning.

Primary Labor Schools.

One of our sorest industrial needs is the providing of suitable work for the young and insuring for them such training as will enable and incline them to do this work—not brain work, but manual labor. Technical education is good in its place, but it is not the want of the masses. They must go directly upon the farm or into the factory, cannery or workshop, with no other preparatory training than can in the larger cities be obtained in manual schools—rudimentary workshops. And we are not so sure but the sooner they are got into these places the better. It may be said that the child that is old enough to go to school is almost old enough to go to work. There is a danger that we are laying too much stress on education as an element of success in after-life, and too little on the importance of setting our youth early to work.

This being a matter of such vital importance, we are glad to see that the newly-appointed Commissioner of the Labor Bureau proposes to inquire into the feasibility of establishing schools of this kind in San Francisco, it being his intention to found here one or more of these institutions, if his present favorable opinion of their usefulness shall be confirmed on further investigation, and the Legislature, at its next session, is disposed to co-operate with him to that end. What renders these training schools the more necessary is the extent to which boys are now excluded from the mechanical trades, employers being allowed to take but a limited number of apprentices. Entering one of these schools, the boy will be able to learn most common trades nearly or quite as well as in the factory or shop. The Commissioner speaks of taking the youth after they have got through with their schooling. This will do, provided they are not kept in school too long. Boys and girls who are kept constantly in the public schools until they are 16 or 17 years old are apt to think they must live by their wits and learning, and therefore rarely ever take kindly to manual labor. The better plan would be to set them to work much earlier, allowing them to go to school a little meantime, say a month or two every year. Or they might, in many cases, attend night schools quite steadily, if so inclined. Boys, after receiving a rudimentary education, such as the most of them obtain in our common schools, by the time they are 12 or 14 years of age, had better be set to doing work of some kind, care being taken that they are not overworked.

It will not, of course, be possible for our entire youthful population to find employment in mechanical and manufacturing pursuits. Many, and perhaps the most, of them will have to take themselves to the land and the mines for a living. What openings these will be likely to furnish to our young people, the importance of our establishing new industries and the inducements that exist here for doing so are subjects on which we will have something more to say in the next issue of the PRESS.

Mineralogical Notes.

A twin crystal of molybdenite has been found near Renfrew, Canada, with other remarkable crystals, some of which weighed nearly a pound.

At Los Cerillos, New Mexico, about 22 miles southwest of Santa Fe, are mines of turquoise which have been worked for centuries. The turquoise occurs hurried in its matrix, sometimes in nodules, often in veins, and varies in color from pure sky-blue to dark-green. A microscopic study of the turquoise indicates that the mineral may have been derived from the alteration of another substance (apatite) with which the vein was formerly filled. The turquoise-bearing rock appears to be eruptive, and probably of tertiary age. Under the microscope it is seen to be composed of feldspar, with a considerable amount of biotite, epidote, iron pyrites, limonite, and some amorphous substance.

OWING to the tricks of the Chinese miners in Northern Idaho, the people are demanding a gold-coin basis in their dealings with them, say an exchange. They mix dust worth \$8 per ounce with that worth \$16, and dispose of it at the maximum figures. Besides this, they fail to burn their fine dust sufficiently, thereby retaining much quicksilver, and also file up silver dollars and mix the filings with the gold.

Technical Society of the Pacific Coast.

President Mendell was in the chair at the last meeting of the Technical Society of the Pacific Coast. M. G. Wheeler, City Engineer of San Diego, and N. S. Keith, electrician, were elected members.

Mr. H. T. Compton, of the Engineers' Department of the State Harbor Commission, read a paper "On a New Method of Differentiation." The object of this paper was to explain a new method of obtaining the differentials of functions of a single variable or of several variables, which is believed by Mr. Compton to be logical and conclusive, and to leave no doubts in the mind of the student as to its absolute correctness. In no text-book on calculus which he had seen is there a clear proof that the limit of the increment of the function, divided by the increment of the variable, is equal to the ratio of the differential of the function to the differential of the variable. All that is proved in the operations in the text-books in question is a particular value for the symbol—for each particular case. Mr. Compton gave several examples of his method on the blackboard.

N. S. Keith read a paper "On the Transmission of Power by Means of Electricity." In the matter of the production and utilization of electricity great strides had been made within the last decade, so that now many things which are viewed as problematical, even in the scientific world, a very few years ago, have been assured commercial facts owing to the improvements made by experimenters in apparatuses for generating electricity.

Prof. Keith's paper was an excellent one, and was listened to with marked interest. It gave the members a very good idea of what had been and is now being accomplished with electricity in furnishing power. At the conclusion of the paper, Prof. Keith answered many questions put to him by the different members, which showed the interest felt in the subject.

Which is the Precarious Business?

How much wheat, wine, fruit or other of her agricultural staples California will produce this year we are unable to say. As much, probably, as usual. We hope so; still, this depends on many contingencies—on the later rains, the insects, the hogs, the rust and "the north wind's breath." What injury these or any of them may inflict on the growing crops no one can say. There lives not the man who can forecast these things. Now, if any there be curious to know how much bullion the mines of California will turn out the current year, though not gifted with the spirit of prophecy, we will tell them very nearly. The sum will amount to about \$20,000,000, sixteen millions gold and four millions silver. We predict that the total will come within a million of the largest figure mentioned; moreover, we are of the opinion that there will be realized on the capital invested in this business a net profit of 30 per cent.

Will parties engaged in any of our other leading industries, mercantile, manufacturing or lumbering, for instance, undertake to tell us as nearly as this how they are going to come out at the end of the year? Let now the wisecrack favor us with a homily on the uncertainty of mining!

NEW ZEALAND GRAPHITE.—Large quantities of graphite exist at Packawan Bay, in Golden Bay, N. Z., which will sooner or later be turned to commercial account. Samples were analyzed just as they were taken from the ground, with the following results:

	No. 1.	No. 2.
Carbon.....	34.99	51.45
Ash.....	.65 01	48.55
	100.00	100.00

No. 2 appears to be as good in quality as much of the graphite sold in commerce for common purposes.

TELEGRAPHS IN CHINA.—It is stated that the Marquis Tseng, who has lately returned to China from his long residence as representative of that empire in London, has signalized his arrival in his native country by earnest endeavor to have a line of telegraph completed between Peking and the most important trade centers in China. He has submitted plans prepared by competent men to the Imperial Government, and it is expected that these will shortly be accepted.

The Late Dr. Kellogg.

Dr. Albert Kellogg, the last one of the charter members of the California Academy of Sciences, died at his residence in Alameda on Friday last, in the 74th year of his age. Dr. Kellogg was one of the best-known scientists on the coast, having devoted himself to botanical research in this State for the last 30 years. For the past three or four years he has been working at the Academy on a small salary derived from the Crocker Scientific Investigation Fund—money donated by Charles Crocker for the assistance of those persons who, by their devotion to scientific pursuits, have incapacitated themselves from following ordinary occupations. Dr. Kellogg has devoted a great deal of his time of late years to investigation of the Pacific Coast forest trees, on which subject he was an authority.

As one of the earliest workers in botany on this coast, he found a wide field for research, and has described hundreds of new species from time to time. The results of a great deal of his work have appeared in the published proceedings of the Academy. A large amount of MSS., however, is still unpublished. He has in his day traveled all over the coast in his botanical trips, but for the past few years physical infirmity has prevented active field work.

Dr. Kellogg was one of the most simple-minded of men, thoroughly devoted to his chosen branch of science, and utterly regardless of all pecuniary rewards. Gentle in manner, unselfish and pure in thought and deed, he endeared himself to all with whom he came in contact. He was always willing and pleased to assist students and investigators of less experience. His was an exceptional character in many respects. Leading an uneventful and quiet life, and pursuing his favorite study, he passed his days free from all the worries of a money-getting career. An enthusiast in botany, and a man of close observation, it is no wonder that he accomplished a vast amount of good work in his time. The Academy of Sciences loses one of its most valued workers, and one who was thoroughly devoted to its interests.

At the meeting of the Academy on Monday evening, an adjournment was taken out of respect to the memory of Dr. Kellogg. A committee, consisting of Dr. Geo. Hewston, E. L. Greene and Dr. H. Behr, was appointed to prepare suitable resolutions, to be read at the meeting of the 18th inst. Memorial services will be held on Sunday, April 10th, in the Swedenborgian church, in this city.

In this connection it may be stated that through the suggestion of ex-President Geo. Davidson, of the Academy, a lot will be purchased in the cemetery at Oakland and laid out to receive the remains of deceased scientists, in case no other provision has been made for them. Capt. Kohl, of the Alaska Commercial Co., has already donated \$100 for the purpose.

The Sutro Tunnel.

At Carson, Nevada, on the 4th inst., the Sutro Tunnel Company, through its attorney, Theodore Sutro, applied to the United States Circuit Court, of Nevada, for leave to amend the answer in the foreclosure suit brought by McCalmont Bros. & Co. against it, by presenting additional defenses. The application was filed by Theodore Sutro and Col. M. N. Stone, on behalf of the company, and resulted in an order from the court granting to the Tunnel Company leave to amend, and 40 days' time within which to take further testimony, and 40 days additional for the plaintiffs to take testimony in rebuttal. The court also ordered that the receiver pay to the plaintiffs the money in his hands, without prejudice to the defense, retaining \$25,000 for contingent expenses, thereby avoiding the loss of interest to the company. The rulings of the court are an important gain to the company.

In this connection it may be stated that the Virginia Enterprise says that the Sutro tunnel, which was formerly controlled by the McCalmont Brothers, the bankers of London, and who hold the mortgage on the company's property and franchise, has now passed into the hands of the stockholders in New York City, by the election which took place Monday, March 28th. The suit now pending against the property in foreclosure will probably be withdrawn or compromised by the payment of the amount due the McCalmonts, of London, and

the property, which is now yielding a monthly income of about \$30,000, with the prospect of being largely increased, is expected to place the company on a paying basis.

Mending Cables.

All the great Anglo-American Telegraph Companies keep a neat little steamer for cable-repairing purposes. When a break or defect in the cable occurs it may be discovered from the shore station, and located within a few hundred yards by the skillful electrician. The little

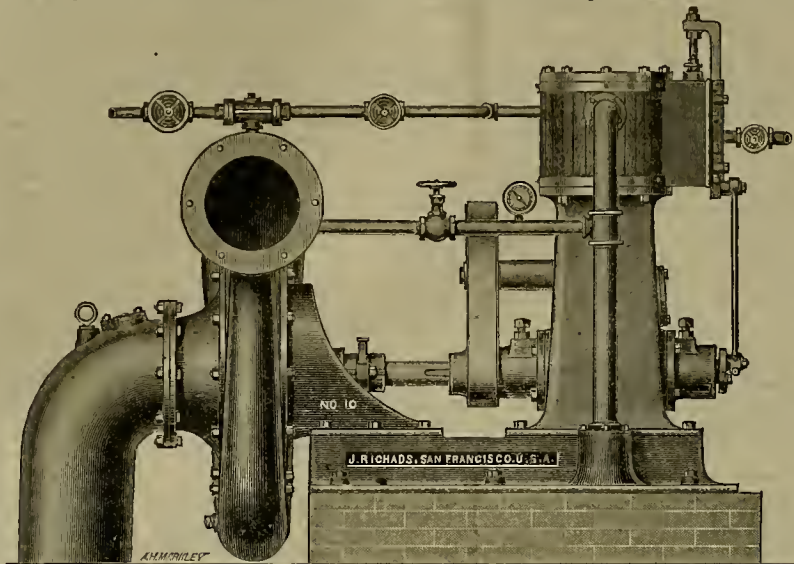


Fig. 3.—RICHARDS' COMPOUND CONDENSING ENGINE AND DRAINING PUMP.

steamer is then sent out to repair the fault, and sails to within a half or three-quarters of a mile of the break. A strong hempen rope, wire-strengthened, is then let down with a large grapnel at the end. This grapnel has four hooks, at the base of which is a small iron pin about a half-inch in diameter, which is pressed in when the weight of the cable comes upon

Richards' Patent Hydraulic Machinery.

NUMBER 2.

Fig. 3 of the accompanying engravings shows a steam centrifugal pumping engine.

These engines are of the compound type, having a trunk-piston reducing the acting area of one stroke to one-half that in the other, the steam being transferred from one side to the other and used twice, the same as in the case of two cylinders, the valves and ports being arranged with proportions corresponding to volume of steam at the different pressures.

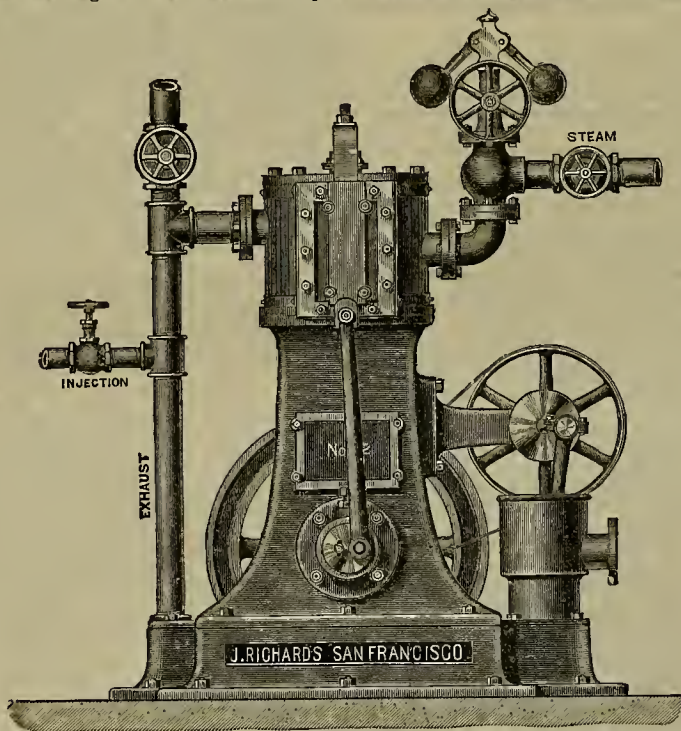


Fig. 4.—RICHARDS' PATENT COMPOUND CONDENSING STEAM ENGINE.

it; this pressure closes the circuit on a small wire in the center of the grapnel, ringing a bell in the electrician's office. When the bite of the cable has been hooked it is pulled to the surface, with greater or less difficulty, according to the depth of the water. It is then cut and the end set in a tablet in the office of the steamer, so that the electrician can test it, let us suppose, first to the westward, and finding that he cannot reach the shore in that direction, he then tries it in the opposite direction and locates the break exactly. The shore end is then buoyed and the cable is pulled on the deck of the vessel, by means of an engine connecting with a great drum, and when the fault is discovered it is cut out and spliced and then paid out into the deep.

This method of working is not new. It has been applied to at least one steamer on this coast, and has been carried out in some successful-working engines made at the Risdon Iron Works, in this city. The new features of the present engines consist in the method of their construction, the working parts being inclosed in the main framing to secure lubrication, as in

Foundry Notes.

At the Golden State and Miners' Iron Works they are building one of J. B. Osborne's steam wagons of the pattern which we described in the PRESS of Nov. 20th last, page 336. The new steam wagon is for use on the Mojave desert to haul ore from mine to mill, a distance of nine miles. The boiler on the machine is of locomotive pattern, and the two engines have 6½-inch cylinders, 12-inch stroke. They are geared to make 30 revolutions to one of the main driving-wheels. The main driving-wheels are 6 feet in diameter and 14-inch face. The steering is done by steam. The traction engine is about 25 feet long. It carries its own coal and water. The machine is intended to have a train of four wagons each with 25 tons of ore. Each wagon has a separate engine, furnished with steam from the main boiler on the forward engine. The main wagon weighs, loaded, 22 tons, and each cart 30 tons when loaded.

The following is a brief statement of the machinery which has recently been furnished by the Joshua Hendy Machine Works: One double circular sawmill complete with necessary steam-power for use in Siskiyou county; one outfit for sawmill, and required steam-power also, shipped for use to the same county; one complete hydraulic plant, consisting of a 20 inch hydraulic gravel elevator, necessary hydraulic pipe, water-gates and giants for hydraulic mining in Siskiyou county. It may be here stated that, although our journals teem with accounts of the "boom" which has overtaken the sunny southern portion of our State, and in which we, of course, rejoice, yet it will be found that even that portion of our State which we have been led to consider as the frozen north is performing its own good work in contributing to the channels of foreign and interstate commerce the usefulness of its vast forests and the wealth of its mines.

The same works have also just completed and shipped a complete hoisting and pumping plant for use in Inyo county in developing a mine belonging to one of the distinguished candidates for the Democratic nomination in the last gubernatorial campaign. They have further furnished for the Port Blakely Lumber Co. a battery of five steel boilers of the best form of construction and fully equipped with the latest-improved fittings. They have also furnished to the Lighthouse Department of the 12th District, under the able supervision of Captain A. H. Payson, Corps U. S. Engineers, one boiler and fittings for Point Montara, boiler for Point Reyes and a boiler and fog-signal engine for Yerba Buena island, all of which were constructed under specifications from the U. S. Engineer's office and subjected to Government inspection and duly accepted. They have supplied for the use of the cannery at Astoria, Oregon, under the management of Messrs. W. T. Coleman & Co., a large and complete boiler. They report the sales of several boilers and engines for use in the Southern counties, and that their business in the especial manufacture of automatic ore-feeders and Triumph concentrators, and sales of same, have been exceedingly good, and large orders have been filled and are in hand for Idaho, Montana, Dakota, New Mexico, Mexico and our own State of California.

Having recently accepted the agency for the sale of the celebrated band-log sawmills manufactured by Messrs. Smith, Myers & Schiner, of Cincinnati, Ohio, they have entered into a contract with J. P. Pierce, Esq., manager of the Pacific Mills Lumber Company, of Pacific Mills, Santa Cruz county, for the furnishing for the use of that company of one of their largest sizes of band-saw mills, and when it shall have been received and placed in operation the agents extend a cordial invitation to those who are interested in sawmill or lumber enterprises to visit and examine this mill, which is believed to be superior to any other similar form of mill yet placed in operation in our State.

SILVER MINERS are anxious to know when the "bottom notch" for silver will be reached. A short time ago it was over 100, and now it is down to 93½ per ounce. Par value is supposed to be \$1.29. With the present heavy discount, considerable loss is entailed on all silver producers.

PROSPECTORS have discovered some rich ore in Summit canyon, Nye county, Nev.

MECHANICAL PROGRESS.

The Use of Steel in Russia.

The Russian Government, through its ministry of roads, has decreed and published a series of regulations concerning the use of steel in the construction of all work connected with railroads and railroad bridges, which show a degree of care taken by that Government in the construction of such means of transportation, which might well be considered, if not imitated, by our own Government, especially in view of the recent disastrous bridge accidents which have been attended by such great loss of life. We append a brief summary, as follows:

1. Steel, whether Bessemer or Siemens-Martin, may be used in all structures.

2. In view of the great sensitiveness of steel to mechanical working, it is to be noted that:

(a.) Plates and other sections must be tempered, after rolling, by means of the sand-bath. Care must be taken that on leaving the rolls the metal is not below a cherry-red heat.

(b.) Holes must not be punched, but drilled. (c.) When worked cold, the material must not be sheared, but cut with a chisel. The edges must be planed. All boring must be done hot, and provision be made for subsequent slow cooling.

3. The material must possess the following properties:

(a.) It must contain from 0.05 to 0.20 per cent of carbon.

(b.) Except for rivets, the tensile strength of all kinds of steel must be from 25.4 to 29.8 tons per square inch, extension at least 18 per cent, and the contraction of area at least 36 per cent.

For rivets, the tensile strength must be from 22.2 to 25.4 tons per square inch, extension at least 20 per cent, and contraction of area at least 50 per cent. The percentage of carbon for rivets must approach the lower limit (see a). Extension and contraction of area are to be measured on test pieces of 10 inches in length. The test pieces must be worked cold.

4. A strip of the metal 10 or 12 inches in length, heated to cherry red, and then plunged into water at 85½ degrees Fahr., must not show any cracks when so bent that the inner faces of the bent piece, at a distance from the angle of one and one-half times the thickness of the plate, are three times the thickness of the plate apart.

The permissible strain upon all material used in bridges is given in full detail, graduated according to the length of span, character of bracing, etc.

Iron and steel may be used in the same structure, but with the limitation that in each member of the group of similar parts the same material is to be used. For instance, the top and bottom booms of a girder form such a group; the diagonals and verticals of a girder, the cross and longitudinal roadway bearers, are other such groups, etc.

"SCAMPED" PIG IRON.—During the year 1879-80 a large quantity of very poor pig iron was shipped to this country from Great Britain. Its quality was very soon discovered, and for years much of it has stood piled up in one place or another, taking up valuable space or increasing its already too great cost by storage and interest charges. In some cases a little—very little—of it has been used occasionally in a mixture, usually with the result that it has been found a good thing not to use. The cause of the poor quality of this iron was not well understood until quite recently, when, from some proceedings in an English court, the fact came out in evidence that the Monkland Iron Co. (Scotch) used no less than 3500 tons of mill cinder to mix with their ores to keep their furnaces running for only 4½ months. Given a furnace as small as the Monkland running of Scotch iron ore, with a large per cent of mill cinder as a mixture, and what must the iron be? No wonder it sells for \$2.50 a ton less than standard brands.

WIRE ROPE—NEW MODE OF MANUFACTURE.—Hitherto on the fracture of a wire or wires composing ropes, the wire or wires are liable in usage to detach from their fellows, thereby proving a source of weakness to the rope. To prevent this detachment Mr. F. W. Scott, of Reddish, proposes to combine two of the wires forming the outer or inner wire of a strand or rope in such a form as to prevent the escape of a fractured wire or prevent the detachment of a fractured wire from its fellows. He binds the two outer or any inner wires with a clip or guard of thin steel in such a manner so as to grip the wires in pairs tightly together, a number of which are afterward twisted together, forming a strand or rope. The edge of the clip is free from the outer periphery of the outside wires, passing beyond the center of the diameter of the wire so as to securely hold them in position.

SWORD-BLADES.—The character of sword-blades and bayonets furnished to the British army and navy is still a subject of discussion in Great Britain. The "scamping" resorted to, for the purpose of securing unjust gains out of contracts for furnishing the weapons for the Government, has led to an almost total discontinuance of the manufacture of the blades in England, and they are now imported from

Germany. Sword-blades in this rough are also largely imported into this country, and the weapon merely "finished" here. It would seem that our native mechanics ought to be able to turn out good work at prices which dealers can stand. If not so, let our mechanics be "protected" until they can do so.

Tempering Drills to Drill Saw Plates.

A correspondent of the *Blacksmith and Wheelwright*, who has been running circular saws and gearing and filing and setting saws for the past ten years, after having a great deal of trouble to get a drill tempered to drill holes in cracked saws, has finally discovered a plan to accomplish this work which he says never fails. It is as follows:

After learning the grade of the steel and what heat it will stand, procure the best drill steel and forge out to shape, leave it as heavy above the drill point as it can be and still be clean in the hole after it is drilled. Have your drill tapered or beveled so that when the heel of the bit is cutting, the point will be through the plate. File up sharp with a very fine file. The cutting edge should be sharp and smooth. If a coarse file is used it will leave a rough edge that will cut in soft iron well enough and in steel would crumble. Procure a block of lead, heat the drill to a cherry red and drive it into the lead, say half an inch, and then leave it to cool. If the steel is good, it will never be too soft and may sometimes be too hard. If too hard, don't try to draw the temper, as it will then be too soft on the cutting edge. Temper over and don't heat quite so hot, and you will soon learn what heat the steel will require. I have one that has drilled a great many holes and is sharp yet. Never use this drill on iron, as it will fly like glass, and there is as much to keep in mind in using a drill for this work as in tempering it. Always use a hardwood block under the plate to be drilled, and it should be one on which the saw will rest only when it is under the point of the drill. Never force the drill, and use plenty of oil. When the heel of the drill is about through, turn it and feed very cautiously, or you will break your drill or crack your plate if it is thin, and that crack will not be seen until the saw has been run some times.

I have had saws brought to me that had been drilled and had had a piece of brass or copper riveted in the drill hole. They cracked again farther down. Never plug a hole that has been drilled in a saw plate. I have never seen a saw crack below the drill hole, if drilled properly. When a saw is cracked, it is cracked further than the naked eye can see, so you must get the course of the crack and drill in that course, say one-half of an inch further down. Then your saw will never crack again unless it goes to pieces.

A NEW BRANCH OF IRON MANUFACTURE.—Mr. James Willing, a well-known English advertising agent, has made arrangements for the establishment of a factory in Philadelphia for the manufacture in that city of the well-known enameled iron sign plates and tablets, which have heretofore been imported from England, where alone the art of their manufacture is known. He will bring over skilled workmen with him. This new industry has assumed quite large proportions in England, and quite a good demand for these articles has sprung up in this country. They are also being extensively used on the continent and in India.

LIGHT AND HEAVY HAMMERING.—There is a difference in the driving effect of a light hammer when compared with the blows of a heavy one, or a rusty machine bolt would not remain to be riveted up all out of shape when a six pound sledge will take everything before it. The driving effect from any source seems to require time to act in order to extend a great way into the material. This is noticed in heading up a rivet, where the metal can be worked down into a cone-shaped head by the upsetting effects of a sharp blow, which will be crippled at once under the crushing force of a sledge-hammer.

HARD AND SOFT EMERY WHEELS.—Hard, close-grain emery-wheels do not cut so rapidly as soft, loose ones, from the fact that the particles in the hard stone are more compact, and the edges wear slightly before breaking, while in the soft wheel the cement wears first, and more rapidly, presenting new cutting edges to the work, which, when but slightly worn, will pull out of the wheel on account of this increased friction surface, fresh sharp edges replacing them. This is proved by the fact that the fastest-cutting wheels are the softest.

LOCOMOTIVES FOR SOUTH AMERICA.—H. K. Porter & Co., of Pittsburgh, are building a number of small plantation locomotives for South America, which are preferred to those made in France and England, and it is said that the bulk of the trade is coming to the United States. Shipments are being made to Venezuela and Ecuador. The water is carried in a tank over the boiler, and the cab is an open sheet-iron canopy.

THE BRONZE CASTING ever undertaken in America was accomplished successfully some days ago by the Henry Bonnard Bronze Company, of New York City, who are engaged upon the equestrian statue of Gen. Meade, for Philadelphia. The metal was 90 parts copper and 10 parts tin, weighing altogether 7500 pounds. The statue, when finished, will be 16 feet high and weigh about 10,000 pounds.

SCIENTIFIC PROGRESS.

A NEW THEORY OF BOILER EXPLOSIONS.—M. Hochereau, formerly a works manager in Belgium, has recently published a curious theory of what he calls fulminating explosions of steam boilers. He attempts to demonstrate that these fulminating explosions are to be attributed principally, if not exclusively, to the ignition by an electric spark of a mixture of air and more or less highly carburated gas produced in the boiler. For this it is necessary to establish three points: First, the possibility of an electric spark in the normal conditions of working boilers; secondly, the production of a more or less pure hydrocarbon gas; thirdly, the presence of the air necessary for the formation of an explosive mixture. As to the formation of an electric spark, it is known that electricity is generated from the friction of steam escaping from narrow orifices; and M. Hochereau says he has witnessed the appearance of sparks when steam has escaped from a crack in a plate. He declares also that if the steam escaping from the safety valve of a boiler is observed in the dark, under favorable conditions, an electric aureole of 0.20 or 0.30 meter in diameter may be perceived round the valve. The spark is also produced when the steam valve is opened, as well as at the opening of the slide valve of an engine. Then the presence of hydrogen, more or less carburated, is ascribed to the decomposition of organic matters, especially of a fatty nature, which find their way into the feed-water, particularly when condensed water is returned to the boiler. Finally, the necessary air is supposed to be derived from that dissolved in the water and given off when it is vaporized. It is a fanciful theory, and requires verification.

GAS AND ELECTRICITY.—Electricity has of late been making rapid strides toward becoming an important factor in the illumination of cities. So important has this new illuminating agent become, that the gas companies in New York and other large cities have, for some time, been considering the propriety of taking up the electric lighting business and uniting it with their gas interests, and thus operating them in unison—supplying either gas or electricity, as their patrons might prefer. Mr. J. R. Thompson, a well-known authority in everything pertaining to gas lighting, says, in reviewing the developments of 1886, that "there can be no doubt any longer that the gas fraternity of the United States have about made up their minds to embark in the electric-lighting business on joint account with gas supply, and there can be no possible ground for not believing that many of those who sanction the plan are eminently well qualified to pass a dispassionate, just and logical verdict in the premises. Summed up in a few words, these have their opinion on the fact that electric lighting has come with us to stay, and being with us as a permanency, the gas man can supply it more efficiently, and at the same time cheaper, than can be done by those who would seek to control it as an independent, or, rather, distinct branch of commercial and domestic service. This, then, can be set down as one of the revolutions effected in the sentiment of the artificial lighting business during 1886."

A ONE HUNDRED AND FORTY-FIVE HORSE-POWER WHALE.—Sir William Turner, the eminent professor of anatomy in the University of Edinburgh, recently delivered a lecture to the members of the Philosophical Institution of that city on "Whales, Their Structure and Habits," in the course of which he referred to a point of considerable interest to engineers, which was the horse-power exerted by the tail of a large whale. Regarding the length of full-grown whales, Professor Turner remarked that the Greenland right whale was from 50 to 60 feet long, and he said that the great fin whale, which frequently visited the British seas, reached the length of 80 feet, or even more. It had been estimated that the Greenland whale could attain a speed of 9 or 10 miles an hour, and that the fin whale attains even a greater speed. He had asked Mr. John Henderson, of Glasgow, the well-known builder of the Anchor liners, to assist him in arriving at the horse-power which must be exercised by one of these great whales so as to acquire a speed of 12 miles an hour, and he put the case of the Longidry whale before him. It was 80 feet long, weighed about 74 tons, and had a tail 18 to 20 feet across from the extreme ends of its flanges. With these data, Mr. Henderson calculated that a whale of the dimensions mentioned, in order to attain a speed of 12 miles an hour, would require to exercise a propelling force of 145-horse power.

THE SPHEROIDAL STATE OF WATER AS SEEN IN GLASS WORKS.—The spheroidal state of water has long formed a favorite object for experimentation by lecturers. It consists in protecting a liquid from contact with a hot surface, by interposing between the two a layer of gaseous molecules. In glass-works the spheroidal state of water is sometimes illustrated on a large scale. In making colored glass, such as ruby glass, in which gold is the base of the coloring agent, it is often necessary to remelt the charge. The pot of melted metal is emptied by ladling, and the melted glass is poured into water. A barrel of water is placed upon the floor near the opening of the pot, and the workman with an iron ladle pours the melted

glass into the water. It at once sinks, and, owing to its intense degree of heat, becomes surrounded by an atmosphere or thin layer of steam. The water does not touch it, and hence is but slightly heated. This surface remains quiet, and the depths of the water glow with a diffused red light. After awhile the glass cools, the water comes in contact with it, and hursts into rapid ebullition. Even this ebullition is less violent than would have been anticipated, owing to the non-conducting power of the glass. As soon as a small thickness becomes cool, it protects the center of the mass. If a few lades are emptied into a bucket of water, the effect is far more striking. The red-hot glass can be seen lying in a mass, as large as a cocoon, quietly at the bottom of the pail. It is most impressive to see the great lump of glowing glass maintaining its full heat under the comparatively cold water. This state of things may last for a minute or more before the water boils.

COAL IN EUROPE.—A German technical paper publishes some interesting statements regarding European coal fields still unexplored, and adds estimates of the probable duration of their supply. In Great Britain, the chief coal districts—Newcastle, South Wales, and the Clyde country—yield about 170,000,000 tons per year. Taking last year's consumption as representing the average annual consumption for many years to come, the journal estimates that the British coal mines will not be exhausted in less than from 600 to 800 years. In Germany the coal industry is more favored than in any other country in Europe. It is calculated that drawing upon only one of her fields—the Westphalian—Germany will not be able to exhaust her coal supply in less than a thousand years. She has, in addition, the riches of the Bavarian, the Aachen, and the Silesian coal districts. It is thus evident that Great Britain and Germany alone—to say nothing of France, Austria, Denmark, Russia, Sweden and Italy—are able to supply Europe with coal for a period which makes all speculation about the coming exhaustion of the coal supply, to say the least, highly premature. To suppose, moreover, that a thousand years hence the industrial operations of the world will be still depending upon the coal supply is to put even less faith in the resources and the future of science than would have been reposed in them by a man predicting in the days of primitive writing the inevitable exhaustion of bark.

DECOMPOSITION.—The more rapid the decomposition of a substance, the greater the smell or flavor thrown off, which, in either case, may be pleasant or disagreeable, according to the substance decomposing. There are vegetables that throw off a bad smell when decomposed by cooking, and still have a pleasant flavor when cooked. It makes no difference whether decomposition is brought about by fire or the lapse of time, the result is the same, only more or less intense. Flavor or smell is the gas of the decomposing substance. The blue vat is a method of decomposing indigo. The boiling of dyestuffs is a method of rapid decomposition, without which dyeing could not take place. The more rapid and perfect the decomposition, the better the color, and the quicker it is obtained. The smell thrown off from decomposing dyestuffs in steam contains no coloring matter whatever. It remains in the liquid until abstracted by the material being colored.—*Fabric and Fiber.*

THE LEAP OF THE SALMON.—The power that the salmon possesses of ascending waterfalls is the subject of some interesting details by Prof. A. Landmark, director-in-chief of the Norwegian fisheries. He states that in certain cases salmon have been observed to ascend to a distance of 16 feet, and he feels this to be true from having seen them leap over two masts which were three and a half feet apart, and which had been placed across the river at about 16 feet above the water, at Hollofoss, upon the Drams, at Haugsend. He says, even, that certain salmon, on ascending a vertical fall, are capable, if they meet the fall at right angles with the muzzle, of remaining a minute or two in the midst of the mass of falling water, if they do not succeed in passing over the fall at a single leap.

THE AGE OF FISHES.—Professor Baird says that as a fish has no maturity there is nothing to prevent it from living indefinitely and growing continually. He cites in proof a pike living in Russia whose age dated back to the 15th century. In the Royal aquarium at St. Petersburg there are fish that have been there 140 years. He asserts that carp have been known to attain the age of 200 years. Goldfish have been known to live 50 years. Probably some people will doubt what is said by Professor Baird about the age a fish can attain. If they doubt, they are simply doubting the best known authority on fish.

ARTESIAN WATER PRESSURE.—Sometimes the pressure of an artesian flow of water results from a gas pressure instead of from a high head of water. Dakota has several artesian wells, 1000 feet deep, with 250 to 280 pounds pressure; but there are no high places very near to give this head of water.

A STRONG solution of alum water applied several times a day will remove warts from animals.

ENGINEERING NOTES.

Progress of Electric Lighting.

When the last census was taken, to wit, in 1880, the census man did not consider the electric-lighting investment of sufficient importance to warrant him in collecting the data. Capital was at that time in a condition which might be called undecided, so far as the electric-lighting field was concerned. The great promise that had been made for electric lighting by ill advised persons had not then been realized, and the difficulties in the way—difficulties which, it should be said, always array themselves in the path of novel enterprises—seemed to present an insuperable barrier to the development which, at that time, was thoughtlessly promised and is now being realized. We say thoughtlessly promised, because, while such development was not an impossibility in the future, the claims that were made of immediate profits were absurd, and investors unfamiliar with the field and its possibilities, who had been encouraged by these rash promises to come in, were soon stampeded.

But there were men with brains, as well as capital, in the electric-light business. It was enough for them that the prospects were bright, without the expectation of getting an immediate profit. The demand for the light increased as the apparatus for its distribution was perfected, and as improvement was constant, the business grew. At first, as we have said, it was slow, then faster, until finally it sprang into public favor at a bound, and is now recognized as one of the best-paying industries. We say that its rise and progress have been phenomenal, and if any one doubts it we would refer the doubter to the fact that investments in electric lighting and the manufacture of its accessories have, in only six years, advanced from nothing to \$92,000,000, while the value of electric-light patents is estimated at \$15,000,000.

From 1881 to 1882 the business of supplying electric light almost doubled, and has doubled year by year ever since. It cannot, of course, go on at such a rate as this much longer, for the doubling process, if continued, mounts soon to infinity. There are over 650 local electric-lighting companies in the country to-day. At least 125,000 voltaic arc lights are now lighted nightly. There are also about 640,000 incandescent lamps aglow to-day in the United States.

The question as to electric-lighting popularity has always been one of economy. No one ever doubted that electric lighting would be popular, but many did doubt if it would ever be cheap enough to be generally used. Happily, the cost of distribution, the cost of apparatus and of lamps, has become less and less yearly, indeed, we were about to say monthly, for those who are watching the movement have been surprised to see how quickly one improvement has to give way to another. To-day, the cost of an electric-lighting plant is less than one-half what it was six years ago, and there is every reason to believe that six years from now almost an equal decrease in cost will have been attained. We condense the above from the *Electrical Review*.

CROSSING THE ATLANTIC IN FOUR DAYS.—The project of crossing the Atlantic in four days is being carried out in earnest. The first steamer to accomplish this is already commenced, and 11 others of the same calculated speed will be launched as fast as they can be built. The models and drawings for these fast steamers are said to be quite unique, but promising in appearance, and the chief engineer, Robert M. Foyer, is quite confident that the proposed speed will be fully attained. The first one, the *Pocahontas*, instead of being built on lateral lines, will be built upon 68 transverse steel walls or bulkheads, $7\frac{1}{2}$ feet apart. These walls will have openings cut in them for the saloons, passageways, tunnels, etc., with vertical longitudinal walls through them, thus making 1060 water-tight compartments. She will be provided with compound engines of 27,956-horse power, capable of giving a speed of 22 knots an hour. There will be 20 boilers to furnish steam for the main engines, with three smoke-pipes on each side of the ship next to the rail. What effect heavy seas will have on the smoke pipes thus arranged remains to be seen. Her dimensions are to be 540 feet in length, 40 feet beam, and draft of water 25 $\frac{1}{2}$ feet.

INCREASING THE FRICTION.—The system of throwing sand on the rails in front of the driving-wheels, by a jet of compressed air or steam, has been found very successful on the Midland railroad (England), and that company is about to extend its use, and is building ten engines with a single pair of drivers in place of the four-coupled engines used on this road for many years past. The jet of sand will, it is expected from the results of experiments, be found to give sufficient adhesion. The cost of coupling rods and the large pair of hind drivers will thus be saved. The system, as applied to an ordinary American-type engine, is also to be tried on a prominent road in this country.

THE PROPOSED BRIDGE over the Straits of Messina, which separate Sicily from Italy, will, when consummated, form one of the most striking feats of modern engineering. The place selected is where the channel is 2 $\frac{1}{2}$ miles wide and 361 feet deep. Two piers will support the viaduct of steel rail at the dizzy height of 328 feet above the water!

USEFUL INFORMATION.

HOW TO MAKE GLAZING OR HOUSE PAINTERS' PUTTY.—In carriage-painting we use a putty that for glazing glass is worthless, as it will not stick to the glass after it has dried with any degree of tenacity, especially so in window-glazing. And as it often happens that the painter (especially when working in the country, where house-painters are not so plentiful) is called upon to put a new pane in a window, it may be well to instruct some who are probably ignorant of the formula for mixing glazing putty suitable for the purpose. House-painters' putty proper is nothing but whiting and oil mixed together, with sometimes a little japan or sugar-of-lead thrown in to harden it more quickly. Take the whiting, add the oil until you can work it with the hands; do not get it too dry. After you have kneaded it so that the oil has been absorbed by the whiting to work it soft enough for easy use, pick it up in the lump and throw it down heavily on the stone until you get it to suit you. Our regular trade putty, in which white keg lead is used, always gets hard and tough when worked too much, whereas the oil and whiting putty gets softer and softer as you work it.—*The Carriage Monthly*.

DOES FROST WEAKEN RAILS?—"No," said Chief Engineer Hoyt, of the Rochester & Pittsburg railroad, recently, "the low temperature does not decrease the strength of the rails, as is commonly supposed. But accidents are more likely to occur from broken rails in cold weather. The reason is that the ground when frozen solid is rigid and loses the elasticity that acts as a safeguard in fine weather. When a train runs on such a road-bed something must yield, and as the rail is the weakest point it gives way. I was laying a track in Illinois some years ago over the prairie, and trains ran on it for months without breaking a rail, but a severe frost came that disturbed the sleepers, lifting some of them and causing an unequal distribution of weight. Immediately afterward we began to hear of broken rails at numerous points. Extended experiments have been made with testing machines on steel and iron rails, and we find that the cold does not weaken the metal at all. The frost is also likely to diminish the safety of bridges by causing the metal to contract and produce an unequal strain on the trusses, etc."—*Rochester Post-Express*.

TO LAQUER AND OXIDIZE BRASS.—Muratic acid and arsenic in the proportion of one ounce of acid to two ounces of arsenic (arsenous acid) will blacken brass. Lacquer of all kinds are made by dissolving shellac in alcohol or wood spirit. As good a method for a beginner is to keep adding shellac to a sufficient quantity of alcohol until the varnish is as thick as you think you need. As a rule, beginners make their lacquer too thick; about one ounce of shellac to 10 or 12 of alcohol is about right. To this shellac varnish is added various coloring matters, soluble in alcohol, to give to the lacquer a golden color. These colors used to be obtained with dragon's blood, aloes and gamboge; but recently aniline colors, such as are sold as poor man's dyes, diamond dyes, etc., afford all shades of yellow and red. These added to the plain shellac varnish will give all the imaginable gold, red gold and coppery hues one can desire. All work to be lacquered should be warmed, and the lacquer applied with a soft camel's hair brush; several coats can be applied.—*Ex.*

A UNIQUE STRUCTURE.—The main building now being constructed on the grounds of the American Exhibition of the Arts, Inventions, Manufactures, Resources and Products of the United States, at Earl's Court, Kensington, London, is entirely unique, and will in itself be a most interesting exhibit. The entire framework of the structure is composed of steel rails, such as are used in constructing railways. Two of these, bolted back to back, with the T side out, make a very strong and really ornamental column. The only casting required is an angle iron and eyebolt, into which the ends of the rails are slipped. This frame will then be covered with plates of glass and sheets of corrugated iron. The advantages are many. For rapidity of construction it is unequalled, as an acre a week can be easily put up; and it has also the advantage of economy, no skilled labor being required to put it up or take it down, and finished with the material is as good and marketable as when first purchased.

RAT COLONIES—A NEW INDUSTRY.—Why not? "The rat skin is said to be finer and stouter, and will bleach whiter and lose none of its strength more readily, than any other substitute for real skin, and why not the preparation of rat colonies, where, properly caged, housed, guarded, fed and cared for, the rat may be allowed to multiply and furnish fine skins for fine products?" So asks a correspondent, and we say, why not?

CHEAP METHOD OF PLATINIZING METALS.—In this new process, the metallic object is covered with a mixture of borate of lead, oxide of copper, and epirite of turpentine, and submitted to a temperature of from 250° to 330°. This deposit, upon melting, spreads in a uniform layer over the object. Then a second coat is laid on, consisting of borate of lead, oxide of

copper, and oil of lavender. Next, by means of a brush, the object is covered with a solution of chloride of platinum, which is finally evaporated at a temperature of not more than 200°. The platinum adheres firmly to the surface, and exhibits a brilliant aspect. If the deposit be made upon the first coat, the platinum will have a dead appearance. Platinizing in this way costs, it is said, about one-tenth the price of nickel plating.—*Le Genie Civil*.

THE SHRINKAGE OF FLANNEL.—To keep flannels so much as possible from shrinking and felting, the following is to be recommended: Dissolve one ounce of potash in a bucket of water, and leave the fabric in it for 12 hours. Next warm the water, with the fabric in it, and wash without rubbing, also draw through repeatedly. Next immerse the flannel in another liquid containing one spoonful of wheat flour to one bucket of water, and wash in a similar manner. Thus treated, the flannel becomes nice and clean, has barely shrunk, and almost not at all felted.

DIMINISHED COST OF PRODUCTION.—A gross of steel pens, which formerly cost \$35, may now be produced for eight cents. The cost of making gold chains has been reduced to one-eighth of what it formerly was. These illustrations are but two of many which might be adduced to show the diminished cost of production brought about by improved machinery in metal work.

KNIFE-SHARPENING.—To hone a jack-knife, raise the blade on the back from the bone. It takes the polish off to lay the blade down flat and leaves too thin an edge to stand the hard usage required. The delicate polish that the hone will not imitate is "set" with walrus-hide wheel fed with rottenstone.

QUINCE CIDER.—A very pleasant beverage can be produced as follows: Take a quantity of ripe quinces, cut into quarters, and with the pips, etc., removed. Boil these in a copper with double their weight of water; when boiled to perfect softness, pour the must into a vat.

SEWING MACHINES.—During 1886 there were made and sold in the United States \$17,000 sewing machines. Of these, 647,000 were sold at home and 170,000 abroad. The machines exported brought \$2,190,809, and they went to every country on earth.

NITRATE OF SILVER STAINS.—Dip the fingers into a strong solution of cupric chloride. In about a minute the silver will be converted into a chloride, and may then be washed off with hyposulphate of soda solution.

GOOD HEALTH.

The Cancer Discussion.

EDITORS PRESS:—I observe that you have recently commenced the publication of a series of articles and letters relative to the cure of cancer. Having the most valid reason for gratitude toward this minister of medical skill and beneficence, I hail your articles upon the disease in question with the most lively interest. Some seven years since my wife was afflicted with a supposed cancer upon the face. Two eminent physicians were consulted. Both pronounced it a case of well-defined cancer. One recommended immediate and vigorous treatment. That treatment was to pierce the tumor at its roots with a silver wire, afterward to be heated to a white heat. Disorganization and cure it was said would result. Although then believing this to be more rational than the knife, I hesitated. During my hesitation I accidentally met with an acquaintance whom the practitioner, referred to in your journal, had a short time previously cured of a cancerous tumor upon the neck—a tumor which had twice been removed by the knife of one of our most distinguished surgeons. This was decisive. I at once applied to the specialist of your reference and was promised a cure. That cure was most eminently effected, scarcely leaving the trace of a scar. The disease has never returned, and I have no fear that it ever will. Therefore, from my own experience and a knowledge of the experience of many others under this same treatment, together with that of the history of cancer cure under the operation of the accepted specifics of the medical schools, I believe that a great discovery has here been made in therapeutics as applied to this special disease—a discovery that is destined to mark a new era in the progress of medical science.

The philosophy of this new treatment, as well as its results, bear me out in this declaration. If the scirrhus tumor or ulcer is but the symptom of a diseased blood, is it not more rational to restore the blood to a healthy condition, as one of the chief requisites, than it is to assault the simple symptom with the knife or other violent means? Upon the properties of the blood depend all the conditions of the system. Why, then, neglect this vital element, involving as it does the life and death of the subject in the cure of cancerous difficulties, as well as in other cases? To do so seems to be a plain violation not only of sound philosophy, but of common sense. Hence the knife as a specific for cancer ought, it seems to me, to be abandoned by every medical practitioner who lays the least claim to reason, conscience, or to humane instinct. Under the new treatment,

the symptom not only becomes a point of attack, but the blood wherein ebbs and flows and intensifies the cancerous virus. Therefore, the symptom and the disease here become subjects of assault at one and the same time. If the poison in the blood becomes neutralized, from what source, then, has the tumor to draw its vitality? None! Is the ready answer of the commonest mind. With this then accomplished, health is a consequent follower in all cases where the cancer has not been allowed to pass to its final stages.

But of what immediate avail is all this attempt at reasoning? Unfortunately for the layman, he is the helpless subject of professional dogmas—egotism and obstinacy. Unfortunately for science, professional stupidity and jealousy crucify the Harveys and the Jenners. But like the truths of vaccination and of the circulation of the blood, the discovery in question for the cure of scirrhus tumors is sooner or later to become the great and accepted remedy with every medical practitioner throughout the civilized world.

The medical schools fought both Harvey and Jenner for 25 years in the promulgation of their theories. But truth vanquished the schools, and Harvey and Jenner became immortal. So, in the case under discussion, the medical faculty of San Francisco seem to be too dogmatic, jealous and obstinate in their treatment of the new theory of cancer cure and its advocates; but they are obstinately confronting a great truth—one that is as sure to overwhelm them in the fullness of time as did the truths of vaccination and of the blood circulation overwhelm their fossilized opponents. We will not pretend to state that the now seemingly obscure discoverer of the grand specific under consideration will pass into popular history; but this we will state: that as many do now, so shall many more in the future, if Divine Providence permits, write the name of this discoverer on tablets more enduring than those of manuscript or of marble. W. H. BARTON.

PROTECTION OF THE EARS UNDER CANNON FIRING.—Dr. Samuel Sexton, of New York, says: It is the experience of many officers that the vibrations of great intensity which are given off from some field-pieces and bursting shells, charged with high explosives, are more disagreeable than the heavier sounds of great guns. The metal itself vibrates under these circumstances similarly to a tuning-fork. A very disagreeable jar is imparted to the temporomaxillary articulation when the individual is near a great gun being fired off. This is lessened, it is believed, by standing on the toes and leaning forward. Some simple precaution to be employed by officers and men during artillery practice would seem very much needed, since aural shock is not only painful and distressing, but orders cannot be well heard while the confusion lasts. There is probably no better protection than a firm wad of cotton wool well advanced into the external auditory canal. In suggesting this protection, it is believed that harm can seldom take place from pressure of air from within, since it is known that the violent introduction of air into the tympanum from the throat, by means of Politzer's method of inflation, seldom ruptures the drum-head, though if such a volume of air were suddenly driven into the external auditory canal, the drum-head would, in nearly all cases, be ruptured.

INFLUENCE OF EARTHQUAKES ON THE HUMAN SYSTEM.—A very interesting communication to the *Medical News* has been made by Dr. F. Peyre Porcher, of Charleston, on the influence of the recent earthquake shocks in that city upon the health of the inhabitants. In addition to the natural alarm and fright which were quite universal, some persons were attacked with nausea and vomiting, which recurred or persisted in several cases for days. Two gentlemen on the islands, 80 miles from Charleston, had their eyes filled with tears not to be repressed, but not caused by alarm or fears for their personal safety, for the danger there was not imminent. Many persons experienced decidedly electrical disturbances, which were repeated upon the successive recurrence of the shocks. These were generally tingling, pricking sensations, like "needles and pins," affecting the lower extremities. One gentleman was completely relieved of his rheumatism; another, who for months was nervous, depressed and entirely unable to attend to business, regained his former activity and energy. Several cases of mental disturbance, owing to anxiety and prolonged loss of rest, some of them persistent, occurred among Dr. Porcher's patients.

SUBSTANCES IN THE EYE.—Everybody has experienced the pain and annoyance of "something getting into the eye." What should be done when this happens? In the majority of cases, if the sufferer has the patience to close the eye gently, and keep it immovably closed for from five minutes to a quarter of an hour, the offending particle will be easily and painlessly washed away by the tears which the eye will naturally shed.

CURE FOR BILIOUSNESS.—For biliousness the editor of the *Boston Medical and Surgical Journal* says a plain diet of bread, milk, oatmeal, vegetables and fruit, with lean meat and fresh fish, is best. Exercise in the open air. The victim of an acute attack will be righted by (1) abstinence; (2) porridge and milk; (3) toast, a little meat and fish and ripe fruit, thus coming to solid food gradually.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador Ledger, April 2: Everything about the Wildman is running smoothly. The hydraulic pump of Knight & Co. was at first placed under water entirely, but in that position did not give the results anticipated. After being raised about six feet above the water level its working was satisfactory in every way. Knight & Co. have sent a force of men to the Lambing gravel claim near Lone, to erect the new derrick which the firm has been constructing for some time. The job will take three months to complete. The Amador Canal Co. is doing some extensive repairs to the flume in the neighborhood of Bald Rock, about 18 miles above here.

MAHONEY.—Amador Dispatch, April 2: The Mahoney mine has not as yet been sold, nor is there much prospect of the present owners disposing of the same, as they cannot come to the Eastern capitalists' terms. Work on the surface ground is still continuing, and they are running the 40 stamps with encouraging prospects. It has been rumored that the owners of the Iowa mine have struck a good streak of ore which knowing ones say will yield well. They are working eight or ten men and are running ten stamps night and day.

Butte.

WORK RESUMED.—Oroville Mercury, April 1: The Cherokee mines resumed operations this morning. The Bank of California having agreed to the proposition made by the miners. Wm. Gregory is superintendent, and Jas. Doyle, John Tubey, and Jas. Donovan are section bosses. The men will now be paid monthly, and the surplus, after paying the running expenses of the mine, will be devoted to the back pay of the men.

Calaveras.

THE STICKLE.—Mountain Echo, April 1: We visited the Stickle mine the other day, and have not the slightest hesitation in saying that, taken all in all, it has the best running mill we have yet seen. We have from time to time visited and examined the principal quartz-mills of this county and have found none equal to the Stickle. It runs as smoothly as clockwork, and there is scarcely any jar perceptible. There are 20 stamps, having a 7-inch drop, each of which has a crushing capacity of 3 tons in 24 hours. A 60 screen is used, which, the superintendent informed us, is much better than larger sized ones. The facilities for saving the gold are unsurpassed, at least in this section. Under the present management the Stickle mine is yielding a handsome dividend.

El Dorado.

SOLD.—Placerville Observer, April 4: Ex-Sheriff T. A. Galt & Co. have sold the Independence mine, located two miles southwest of town, to R. S. Raw & Co., for a snug sum. This mine was once known as the Wilder mine, and bids fair to become one of the leading mines of this section. The tunnel started by Stone & Burdick, first 100 feet let by contract running due west from Martinez creek. Also a new location known as the La Panta mine. Shaft down 15 feet, showing two feet of fine ore. Will sink 100 feet or more. La Panta and other veins will be cut by the tunnel which will be run continuously till the La Panta is reached, which will be about 1000 feet, cutting the vein 800 feet in depth. A mill will be erected as soon as the developments will warrant.

Add Utah.

PARK NOTES.—Record, April 2: The Southern Tier Company reports a new strike in the west shaft of the No. 2 tunnel. The ore is very rich and averages from one to two feet thick. The ore shipments from this property from now on will largely exceed all previous records.

CAMP CROSSCUTS.—The 130th regular dividend of the Ontario Mining Company was paid on the 1st inst., aggregating \$75,000, or 50 cents a share. The total of dividends to date is \$8,150,000, and stock is quoted at about \$25 per share. Work is still going ahead at a lively rate on the Whitehead group in Blue Ledge district, and the prospects of something big being unearthed in the near future are very encouraging. Extensive operations on the Story group, just above No. 3 shaft of the Ontario, have been planned for the coming season. Development work on some of the properties on Treasure hill, just west of town, has already begun, and several of the owners declare that great activity will be witnessed up there this summer. Shipments of Crescent concentrates will soon be resumed, and the record this year ought to far surpass any previous year's work. The rapidly disappearing snow is causing prospectors to have their picks sharpened and shovels polished up, preparatory to starting out into the hills. Owing to the bad roads the Crescent shipped no ore last week, and for the same reason the Mackintosh sampler has not received any Ontario or Dairy ore the past two weeks.

Mariposa.

HITE MINE.—Mariposa Gazette, March 26: The Hite mine, which belongs to the management of Judge Walker, is giving employment to 50 men and is running 20 stamps and crushing ore, paying \$40 per ton, with a bright prospect in the mine of there being an abundance of ore of the same character. Hite's Cove is rapidly looming up. Other mines in the Cove that have lain dormant for some time are being looked after. The South Hite has been sold or bonded, and G. W. Barley, who has been stuck to the Cove through the dark days, is developing one of the best mines in that vicinity with a fair prospect of reward for his labor and tenacity in holding on for a better day.

THE BUENA VISTA. under the management of Mr. San Pedro, is giving employment to 40 men. The new machinery is about placed in position, and a large quantity of ore is being piled ready for crushing. It will be but a short time before the sound of the steam-whistle and the roaring of the stamps crushing ore will be heard for miles around.

THE DILTZ MINE.—This mine has been leased for the rainy season, while water can be had for sluicing and hydraulicking, to Joe Schantz and Sam Jacoby, two well-known, industrious miners of that

section. Captain Diltz was anxious to have removed from off his mine of quartz rock a large landslide, which can only be done in the rainy season, while there is water to fill his ditches and reservoirs; hence the lease to Schantz & Jacoby. Although the rainy season has given them but about a week or ten days' wash, they have picked up considerable gold independent of the sluices.

Mono.

BENTON.—Inyo Register, April 1: J. O. Wheeler came down from Benton this week, and says there is considerable work being done on the hill, and with good results. J. F. Miller has a large lot of ore on hand, and will soon commence crushing. Cal Joy has some 9 or 10 tons of high grade ready for shipment. He has a lease of the Tucker & Mitchell property. James McClure has a lease of the famous Comanche mine, which promises well. W. T. Redd is shipping ore. John Kremkow is working ten men on the Kearsarge. J. O. Wheeler is preparing to ship ore from Montgomery. Benton is entitled to a boom, and every one who knows the history of the place believes it will come some day.

MORNING STAR.—Silver City Avalanche, April 2: Since it is almost certain that the Morning Star mine is to be opened up in good shape, it is equally sure that a rich body of ore will be found. Some of the richest gold and silver ore ever seen in this camp came from this mine. It is hardly probable that it has all been extracted, and there is no reason why this should not be a dividend-paying mine.

Nevada.

BONDED.—Foothill Tidings, March 30: Messrs. George Fletcher, Dr. I. W. Hayes and Waldo Waggoner have bonded the Cedar mine, owned by J. R. Nickerson, and situated on the ranch of the latter, some 10 or 12 miles south of Grass Valley. The gentlemen who have bonded the mine propose to interest capital in the venture and will soon commence the work of development. This ledge was discovered many years ago and frequent assays have yielded high values. The situation of the vein and the financial inability of the owner have so far prevented the working of the mine. The ledge is probably the largest in the county, being from 20 to 30 feet wide on the surface. Some specimens of ore from the ledge have been brought to town and show well in free gold. Several boxes of very rich rock—specimens in fact—were taken out of the Crown Point mine last night. The rock came from the north drift of the 300 (bottom) level, and from the bottom of the level at that. The ledge at this point is strong and the average rock therefrom is said to pay well. The Crown Point has our permission to keep up its lick. Another batch of specimens was taken out of the Nevada County mine, Nevada City, yesterday.

COE MINE.—Grass Valley Union, April 3: A. W. Stoddart, lessee of the Coe mine, will soon commence the erection of pumping and hoisting works, and the introduction of water-power to the same, and expects within six weeks to be ready to commence pumping out the mine.

GOLD POINT MINE.—The Gold Point mine near Union hill, upon which operations have been quietly conducted for several years, is opening up encouragingly, and there is a strong vein which is now of good milling quality. The vein is opened upon by a tunnel from the bank of Wolf creek, and has reached a distance of 1400 feet, with a perpendicular depth of 164 feet, and the backs about 200 feet. The ledge has a varying width of from two to five feet, and therefore there is a large amount of quartz that is now available for crushing. The company has it in contemplation to put up a mill this season, and has had offers for that purpose which are being considered. The Gold Point Company has expended a good deal of money in the work that has been done, and no effort has been made to float stock, which has been held in but few hands, who have had big faith in the mine becoming one of the important mining properties of the district.

THE BRUNSWICK MINE.—A dispatch from New York says the shares of the Brunswick mine are being rapidly taken up. The Brunswick is in this district (formerly known as the East Eureka) and has upon it a good 20-stamp mill, and hoisting and pumping works, and has been worked several hundred feet in depth, showing a well-defined ledge. The mine is regarded as a valuable one, if properly developed, and for this purpose the new company was formed to raise a working capital. With this accomplished, the work of reopening the mine will be commenced. Mr. George Fletcher, auditor of the Narrow Gauge Railroad Company, will be the resident director and manager.

RICH.—North San Juan Times, April 2: The mine in Grizzly canyon located by J. G. Hall, and now claimed by J. P. Clark, is supposed to be very rich. We hope it will prove so, as it is but a few miles from this place. The Delhi mine is booming. About 16 tons of rock is being crushed at that mine daily, and it is of the richest sort. The owners of the mine are satisfied with their success, and when they are satisfied nobody else has a right to complain. The Delhi bids fair to become a bonanza—a second Idaho. The Boss mine is showing up first-rate. The shaft is down about 100 feet, and the rock taken from the bottom is said to be very rich. The workmen are now crosscutting to find the walls. The owners of this mine are highly elated over their prospects. The owners of the Grant mine, most of whom reside here, are making extensive preparations for the construction of a mill at the mine in the near future. They have prospected the mine sufficiently to satisfy them that the rock is rich in glittering "ore," and that it will warrant them to expend money to a considerable amount to develop the mine.

OSCEOLA MINE.—James Huntress is working the old Osceola ledge near Rough and Ready. That ledge was famous way back in 1855, when it turned out some quartz which melted about \$225 a ton. But the Osceola was called a "pocket ledge" by the wise men of the early day, and when the ore got to milling as low as \$70 a ton work was stopped, but once in awhile hunting for pockets was done. Mr. Huntress is now putting the mine into shape. He is running up a deeper cut which will make the ledge dry to a much larger extent than it now is, and he expects to find some of those old pockets which were so rich. He washed off the old dump left by the early workers and in the pile he found some good lumps of gold, one of the chunks weighing about eight ounces. Mr. Huntress is fixing to get

water-power on the mine, and we hope he will find pay enough to make him a rich man.

ALTA CALIFORNIA GRAVEL MINE.—Foothill Tidings, March 31: The mine of the above name is situated at Bunker Hill, southeast of Randolph Flat, in Rough and Ready township. The owners are principally Grass Valley and Rough and Ready men, and they have been operating the mine for some four years. The quality of the gravel has been improving for several months and that now being taken out is considered to be first-class, and a cleanup will no doubt justify this judgment and prove the gravel to be remunerative. The lead is 20 feet in width and is worked by the drift process. It is supposed by many that this is the old Alta hill lead, and in that case the owners will soon be wealthy. The mine is especially well situated for developing.

SPECIMENS.—Foothill Tidings, April 4: At about 11:30 o'clock this morning, at the Crown Point mine, three candle-boxes of gold quartz specimens were brought to surface. The estimated value of this ore is \$5000. The rock came from the north drift of the 300-foot level—the same point from which specimens were recently taken. The rock brought up to-day is very rich with gold. One piece about 15 inches long by eight inches wide, and six inches in thickness, has three layers of solid gold running clear through it. The intervening rock is liberally sprinkled with galena and sulphurets mixed with gold. It is the best strike yet made in the mine.

San Bernardino.

WAGES.—Calico Print, April 4: The superintendent of the work of grading the foundation to the new 60-stamp-mill has a difficult time keeping his laborers. The wages paid is \$2.50 per day, and only miners who are "dead broke" will work for such wages, and then only a few days. Some of those who have quit work complain that the food at the company's boarding-house is not satisfactory for the wants of a workingman. Last Monday there were only three or four miners left out of the 30 employed, so the superintendent sent to San Bernardino for farm hands who are more accustomed to work for low wages than miners are. Bob Greer and Jas. Blair recently secured a lease on the Homestead mine, owned by William and John Reed. This mine lies between the Kearsarge and Silver Odessa, and has already a 60-foot shaft and a roof-tunnel worked on the same. The ore being of a low grade, work was discontinued by the Reed brothers. But Greer & Blair were fortunate enough to strike it rich from the grass roots. They are now taking out some fine ore and are much pleased with the prospect. N. Nelson and Joe Sutton have struck a rich pocket on the Bismarck which is panning out about \$20 a day. Nickless & Marlow and several other chloriders are still doing well on this old mine, which has yielded many thousands of dollars to the companies and chloriders who have worked it. Col. E. Birch and Geo. Tait recently obtained a lease on the Pinto near the Comet and commenced to take out ore from the first stroke of the pick. They have a good prospect. The Comet mine is still proving a regular bonanza to the chloriders working on it. Whitten, Boyle, Corcoran and others have realized handsome dividends from their labors, and still are taking out considerable rich ore. A 150-foot tunnel is being started to tap the main shaft at a depth of 70 feet. The leaching works on the Humburg and Bismarck mines are being operated successfully and yielding a fair profit to the owners. The force of men employed by J. S. Doe & Co. has been considerably increased, and now consists of 90 men, including those working at the mill. Ten tons of ore were shipped to the Selby Smelting Works of San Francisco from the Cleveland mine the other day.

Shasta.

LOWER SPRINGS DISTRICT.—Cor. Redding Free Press, April 2: In the immediate neighborhood of Redding, especially in this district, there are numerous ledges and deposits of what is termed low-grade ore; that is, ore that will mill from \$10 to \$40 a ton. These ores are largely sulphurets, but most of them will average from 10 to 30 per cent free gold; some of the ore may be called free-milling, especially near the surface. These valuable deposits of mineral have remained until quite recently unnoticed. About two years since, however, the attention of miners began to be attracted to the same, and since then prospecting has been carried on with such success that there are now two mills in operation, and a third is in course of erection, besides the reduction works and the De Forest plant in Redding. In fact the mining industry in this vicinity has already assumed a healthy and business-like appearance. With reference to the Lower Springs district in particular: The Muchmore mine has one of the finest 10-stamp mills in this part of the country now steadily at work on rich ore. This has every indication of being a very valuable mine and fortunate investment for the owners. The Eureka mine lies just over the hill, west of the Muchmore; the enterprising owners of this mine have a tunnel 140 feet in on the ledge, with fine ore in sight and flattering prospects ahead. The Copeland mine, about a half-mile west of the Eureka, has a good five-foot vein, with ore that mills \$10 per ton from the top of the ledge just under the grass roots. The El Dorado mine, about one-fourth mile west of the Copeland, has a ledge not less than six feet in width; the owners of this mine have a shaft about 30 feet deep on the vein with splendid ore; this promises to be a very valuable lead indeed. The Tiger mine, on Salt creek, just west of the mill, has an eight-foot vein of remarkably fine sulphuretted ore; the owners of this mine have 50 tons of ore on the dump ready for the mill. There are several other good mines in this district. The Lower Springs Mining and Milling Co. has a magnificent furnace of 15 tons capacity, and its new roller mill is now successfully at work crushing ore. When these works are fully completed, they will undoubtedly do first-class work. Messrs. Atkins and associates have the ground graded for their new stamp-mill, situated at the junction of the Shasta and the old Anderson road, on the site of the old Four-mile house, and the boarding-house erected, and are vigorously pushing their work forward. This mill is intended for custom work, which is a step in the right direction.

FLAT CREEK MINES.—Redding Free Press, April 2: Flat Creek district is attracting considerable attention. M. W. Sill, we hear, has purchased the Jacob of Spades mine, in the Flat Creek district, the price being \$2000. Jack Conant has put two men to work, on Spring creek, on a ledge just above

Murray's old boarding-house. Other properties in Flat creek are obtaining notice, and prospectors are overrunning the hills in such numbers as to almost impede locomotion. Mr. Sill has bonds on the following valuable properties in the Flat Creek district: The Black Rock, Red Rock, and the May Queen mines. He also had a verbal agreement with Samuel Broomfield as to the price at which he can take Broomfield's Great Eastern and his water-ditch from Spring creek leading to the May Queen, Red Rock, and Great Eastern. These are among the best properties in the district, and will undoubtedly prove great mines.

BULLYCHOOP.—J. Q. Finch, who was in town yesterday, accompanied by Ed. Aldersley, of Anderson, informs us that the Cumberland group of mines, owned by Foster & Cornwall, are being worked successfully, keeping a ten-stamp running night and day, and they intend putting in another ten stamps as soon as their sawmill is completed. W. K. Springer, of Chico, is putting up the latter; capacity, 10,000 feet per day. The Davis boys have bonded the Poundcake mine to an English company for \$40,000. Machinery is on the road for the Bullychoop mine. Prospectors are working on the Governor Butler, Oriental, Caucasian and other small mines.

Sierra.

PETERSON GRAVEL CLAIM.—Tribune, April 1: Wm. Swan has commenced extensive operations on the Peterson gravel claim. This claim is situated at Loganville and is said to be a promising one. Mr. Swan has two men at work.

Trinity.

A GOOD LEDGE.—Journal, April 2: Jas. E. Given returned from the East Fork district last Tuesday with about 10 pounds of rock from the Golden Chest, which he sent to San Francisco to be assayed. A specimen shown us was very rich, having plenty of free gold. A previous lot of rock from the same ledge assayed \$271.37 to the ton. The mine is owned by Messrs. Day, Given, Hubbard and Healy, and bids fair to develop into a valuable property. A tunnel has been run in tapping the ledge at a depth of 65 feet, where the vein was found to be 22 inches in thickness and between well-defined walls of porphyry and slate. Active operations will be resumed on the ledge in about two weeks, as the snow will be off by that time.

THE MINERSVILLE BONANZA.—From Mr. Newton Tourtlotte, who was in town this week, we learn a new strike in quartz has been made at Minersville. In running a tunnel to drain the shaft from which such rich rock was taken last fall a new seam was found which proved to be very rich—100 pounds of the rock paying \$100. The rock is much harder than the ore previously found, and new means of crushing the quartz will have to be employed. An arastra or a mill will soon be used in extracting the gold.

NEVADA.

Washoe District.

SAVAGE.—Virginia Enterprise, April 2: On the 1200 level the north drift continues in the same favorable quartz body of which mention was made last week. The drift, in passing along it, has cut into it a foot or two all the way, and for a distance of 140 feet shows ore. No. 3 west crosscut has been started at a point 80 feet north of No. 2 crosscut, and is out 15 feet. It is in quartz carrying ore that yields fair assays. The indications are excellent for getting a big body of ore at this point. The body of quartz is large and the quartz very coarse and strong. On the 600 level they are raising to connect with the 500 level. The upraise has attained a height of 45 feet. It continues in excellent ore. On the 800 level they are driving south in a very strong body of quartz, carrying spots of rich ore. The east crosscut on this level is all the way in the same quartz, which here also shows spots of good ore.

HAYWOOD.—Are stopping out from a point in the incline, 75 feet below the tunnel level. At the 200 level, an east crosscut is being run toward the hanging-wall. It is out 35 feet, all in good ore. This ore shows much improvement over that found at points above. Great breadths of ore have been opened up in all parts of the mine. Ten additional miners were put to work last Monday. The Thompson mill, of 16 tons a day capacity, is still running on Haywood ore. To-day the Briggs mill (20 tons capacity) will start on ore from the mine, and in a few days the Likins & Rulison mill (40 tons) will be put to work on the ore. More mills might be run on ore from the mine could they be obtained.

OCCIDENTAL.—In the upper tunnel the south drift from the north incline winze was extended 10 feet; total length, 179 feet. West crosscut No. 2 was advanced 8 feet; total length, 44 feet. West crosscut No. 3 was extended 10 feet; total length, 24 feet. Extracted 11 tons of milling ore. On the 90 level in the lower tunnel, the north lateral drift was advanced 15 feet; total length, 150 feet. From near the face of this drift west crosscut No. 1 was advanced 9 feet. West crosscut No. 2, north of No. 1, is advanced 8 feet. All of these openings are still in low-grade quartz.

CROWN POINT AND BELCHER.—A small force of men was put to work in these mines yesterday morning, and the extraction of ore from points in the levels nearest the surface resumed. Owing to the sticking of a giraffe somewhere down on the incline, as is reported, men did not go to work in the lower levels. A full force of men will at once be put on at both the Crown Point and the Belcher. The resumption of operations in these mines starts up the mills on the river, and puts to work a large number of men who have been idle for five or six weeks.

CON. CALIFORNIA AND VIRGINIA.—On the 1300 level a north drift started from west crosscut No. 1 was advanced 46 feet. South drift No. 2, started from east crosscut No. 1, was advanced 60 feet. On the 1435 level still continue stopping out the usual amount of ore from the bottom of winze No. 2, 105 feet south from the south line of the Ophir mine. The average assay value of all the ore worked at both the Morgan and Eureka mills during the week, according to battery samples, was \$35.35.

GOULD AND CURRY.—On the 300 level the south drift from the east crosscut was extended 16 feet; total length, 49 feet. It is still in clay and quartz, showing value. A north drift from the west crosscut was advanced 35 feet, and is in porphyry and quartz. Repairs to the main shaft are still progressing between the 1200 and 1300 levels. On the 62

level, at a point 70 feet from the Savage north line, the east crosscut is in quartz of low value.

CHOLLAR.—The machinery at the Sharon shaft, on the croppings of the vein, has been put in perfect order. Steam will be got up to-day and work at that point resumed. The shaft is now down 360 feet. At the old Chollar shaft a station is being cut out at the depth of 400 feet. From this a drift will be run to connect with the Sharon shaft. The drift that is being run by the Norcross folks on their 1300 level has yet to go about 100 feet to connect with the old Chollar incline.

IOWA.—Incline sinking on second back ledge to connect with north tunnel is showing considerable fine gold ore. North tunnel shows a strong ledge of good gold ore for over 100 feet, and face still going on in same kind of ore. The incline ledge and ledge in this tunnel are the same. Have just started crosscut from upper McFee tunnel to cut this ledge 100 feet vertically deeper. Fine gold prospects have been had daily during the week from all the openings worked.

ALTA.—The Lady Washington drift has now about reached the point where crosscuts will be started east and west. The Keystone upraise from the 725 level had yesterday attained a height of 131 feet. It is going up in the hanging wall on the east side of the quartz.

HALE AND NORCROSS.—The drift south on the 1300 level has long been passing through Chollar ground. It now lies but 100 feet to go to connect with the old Chollar incline. This will constitute an important air and working connection. On the fifth station level the south drift is now out about 100 feet south from the west drift. It is showing excellent quartz and some good paying ore.

YELLOW JACKET.—All is going on as usual in the ore-producing sections. About 150 tons of ore are shipped to the Brunswick mill, Carson river. A considerable amount of work is being done in the old upper levels, where new deposits of ore are being opened up. In this part of the mine are many large blocks of virgin ground.

DEST.—This mine is yielding a considerable amount of excellent ore. A patent horse-whim will soon be in operation with which to do the hoisting. The mine is on a new belt west of Silver City, through which runs that branch of the Constock which strikes south between the Justice and Devil's Gate.

MEXICAN AND UNION CON.—On the 1300 level the joint Union and Mexican drift running north-easterly, was extended 25 feet. This drift is now 406 feet in Mexican ground. The joint Mexican and Ophir east crosscut was extended 26 feet; total length, 313 feet.

UTAH.—On the 472 level the north drift from the main west drift was extended 45 feet; total length, 410 feet. The face is still passing through vein porphyry and quartz of a promising appearance.

QUINN.—Timbering of shaft to water level completed. Arrangements are now being made for the rection of a new building and hoisting and pumping works.

SIERRA NEVADA.—On the 520 level west crosscut No. 8, started from the south lateral drift, was extended 60 feet. The face is still in a vein formation—quartz and clay.

OPHIR.—On the 1300 level, in addition to timbering, the northeast drift was extended 16 feet; total length, 180 feet. The north drift was advanced 22 feet; total length, 133 feet.

BALTIMORE.—Work is progressing favorably on the 200, 300, 400 and 500 levels. Good assays are obtained where quartz was cut into by the new drift on the 500 level.

BULLION.—The east drift on the 200 level is out 51 feet. It is still in vein porphyry. Good headway is making in cutting out the station at the 300 level.

OVERMAN.—The usual amount of ore is being extracted from the level of the Petaluma-street tunnel. The ore is worked at the Vivian mill.

JUSTICE.—Work is in progress on the 250 and 10 levels. Some good ore is being found. No new developments during the week.

ALPHA AND EXCHEQUER.—The shaft is down 65 feet below the 120 level. No work is at present being done in the drifts on the 120 level.

BEST AND BELCHER.—On the 800 level, work is progressing well in west crosscut No. 4. This crosscut is being run at the north lode.

Columbus District.

MOUNT DIABLO COMPANY.—Esmeralda News, April 2: The Mount Diablo Mill and Mining Co. having ore hauled from its mine at Candelaria. The mine never looked better and the company never had as flattering a promise of paying dividends as at present. With its new mill at Sodaville, the ore can be worked without interruption and at a saving of not less than five dollars on each ton of ore from the Mount Diablo mine, which is opened up showing plenty of ore. There are no less than 1200 or 1500 tons of loose ore in the shutes and in drifts ready to be hauled to the mill; the slopes are all showing an abundance to keep the mill constantly running. The mill, though now ready, will not start up until about the 5th inst., as the company intends having 300 or 400 tons of ore at the mill before starting. They have a few men now at work in the mine, but intend increasing the force. Heretofore the Mount Diablo Co. leased the upper mill, at Bellville, from the Holmes Co., but as it has a mill with all the modern appliances for the economical banding and reduction of ore, it is safe to predict that the mill soon to start will be kept running for a long time, say one and may be two years on the ore now in sight in the company's mine. The residents of Sodaville will soon become familiar with the music of the batteries, which will be accompanied by innumerable bullion shipments.

Spanish Belt District.

BARCELONA.—Belmont Courier, April 2: It is very probable that considerable work will be done this year in the Barcelona mine, at Spanish Belt. This is undoubtedly one of the best mining properties in the State.

ARIZONA.

MOHAVE COUNTY.—*Miner*, April 2: Dick Marsh sent down a small lot of ore from a claim on Stockton Hill, from which he realized well. Labaree and Fitch had 14 tons of galena ore, from the Star-Span-

gled Baner mine, worked last week. The dry concentrator at the Sunlight started up last Tuesday, and Supt. Barry says that it is a grand success. Brobant & Son have struck three or four inches of ore on the southeast extension of the Independence mine, which assays 891 ounces. This is one of this year's relocations. James Oliver had 7½ tons of Prosperity ore put through the sampling process last week, which netted him a goodly sum. The Prosperity is one of the best mines in the Todd basin. E. J. Edmiston came in this morning with 55 sacks of rich ore from the Nigger Baby mine at Chloide. The sampling works were crushing a carload of Oro Plata ore this morning, the first of a shipment of about 40 tons. The owners of this mine have heretofore been shipping to Colorado, and we are pleased to note the fact that our home sampling works are able to compete with Eastern buyers. L. A. Sanderson, of San Francisco, has sold out his interest in the Oro Plata and Mariposa mines, at Todd basin, to John M. Wilson, who is now sole owner of these valuable properties. Sample & Shrope started up their leaching works on the Juno mine last Monday, and are taking 15 pounds of sulphide per day. The work on the mine still continues as usual. Moosau & Higgins have struck ore on the old Sunday-School mine which assays from \$350 to \$600. W. F. Grouds and Ed Godman are running a one-stamp mill by horse-power at Hackberry siding, on ore from the mines owned by the Music Mountain Gold-Mining Co. The little mill has been running only three or four days, but long enough for the owners to satisfy themselves that they will make a success. The ore runs about \$40 to \$50 per ton in gold, most of which is saved in the working.

THE NEW DISTRICT.—*Tombstone Democrat*, March 23: From Charley Marsden, who has recently returned from Volcano City, the *Democrat* obtained the following concerning the different mines and their prospects, and also the outlook of the camp. Mr. Marsden is a practical miner and a gentleman whose opinion can well be relied upon as correct. The Beck mine has been sold to St. Louis parties for a valuable consideration, though the exact figures have not been made known. A force of eight men is now working in a good body of ore. Mr. Calhoun is in charge of the work and has now reached the depth where hoisting machinery is necessary to its profitable development. The shaft of the Volcano has reached a depth of 103 feet, with 140 feet of drifting. The ore is of very good quality, and but very little blasting is necessary, as the ground is easily broken. Supt. Smith has run along side of and exposed the vein the entire length of the drift. The vein has been tapped in several places along the drift and the demonstrated width of the ledge is eight feet and the walls are well defined in porphyry. The John Smith improves in appearance with each foot of depth obtained, as is also the case with the Bachelor and Poahontas. It is Marsden's opinion that just as soon as capital comes and the work of development is backed by money, then all of these and a great many other claims will prove to be very rich, and that the camp will stand far to the front in mining circles, but at present there is no business or work to induce men to go there unless they have sufficient means to bear expenses until the mines are developed. There are at present about 350 men in and around the camp, most of whom are waiting for something to turn up. He says that the greatest trouble is that a majority of the men who have flattering prospects are content with what they regard as a fortune, and get too rich to push their work of development themselves, and they are too poor to employ others to do it for them. Another trouble is the scarcity of water. Two wells are being sunk, having reached a depth of 70 and 80 feet respectively, with no sign of water; but they are still going down as rapidly as possible and will be continued until either water or China is reached.

WEAVER DISTRICT.—*Mohave Miner*, April 2: From a gentleman who has just returned from a trip to the Weaver district we learn the following: About eight miles from El Dorado canyon is the claim of Bowers and partner, who have lately commenced work. They have about eight tons of good ore on the dump which will not go less than \$100. Many of the new locations are within easy distance of the Colorado river, whence ore can be floated down to the Needles on barges or rafts, and from thence to the Kingman Sampling Works at a slight expense, considering the distance. Little and McLean are working the Idaho and other claims, and are getting out some good gold ore, which they are working by arrastras. Several other locations have been made, and numerous prospectors are on the way to the new district, or rather to the recently discovered ledges of an old one, for it is some 15 years since this district was formed. The claim of Messrs. Brown and Miller, which is 15 miles southeast from El Dorado canyon and about 10 miles from Little and McLean's claims, is the best developed mine in the district. They have an average of a foot of ore throughout, the first-class running from \$150 to \$400 silver, while their low-grade ore runs about 80 ounces. Of the latter there is about 60 or 80 tons on the dump which will be leached at the mine next summer.

COLORADO.

REDWELL BASIN.—*Elk Mountain Pilot*, April 2: The work done in Redwell Basin last year showed conclusively that there are a number of good mines there when they become developed. All who are interested in mines in that locality are patiently waiting for an opportunity to get to work, while others have worked during the winter, which is the best time of the year to do developing work. The Crested Butte and Daisy group has been worked all winter by Garrett Fitzgerald and others. They have been running the lower tunnel from the Daisy claim to cut the Crested Butte vein, which they expect to reach by the time that the trail is in condition to pack over. Cutting the vein at the depth which this tunnel is expected to do, good results are looked for in the way of large ore shipments. They will certainly have large enough ore bodies exposed so that it will be no trouble to make large shipments. The Ella lode, very near the Daisy, is being developed as fast as a single shift can develop it. The tunnel is run on the vein for over 80 feet, which is about four feet wide between two good walls. The vein seems to be somewhat broken with here and there a streak of galena and gray copper, lying next to a crystallized quartz gangue rock. The indications are very favorable for striking a body of mineral very

soon, although it is more than likely that the tunnel will have to be extended 40 feet or more. The Arctic lode, in the same vicinity, has a very good showing, and will probably be extensively worked this summer. Mr. Hinds, of Mt. Carbon, did considerable work on the Duster lode last summer, and will probably continue the work again this summer.

IDAHO.

FINE ORE IN THE IRVING.—*Ketchum Keystone*, March 28: Mike Carey took the lease of the Irving mine on Boyle mountain, and with but poor prospects in sight started to work with a will. He has now 12 men at work and is taking out a fine grade of ore at the rate of 20 tons a day. His lease continues until the 1st of next June, and there is plenty of ore in sight to keep him and his men well employed until that time. The strike was made last week and is considered one of the most important discovered on Boyle mountain.

THE CARRIE LEONARD.—Word was received during the week that an important strike had been made in this mine while working in the lower tunnel. The mine throughout is looking well and will produce a large amount of ore during the coming season. The report that the Alturas Gold Company has been made defendant in a suit involving the title to a portion of its property at Rocky Bar, grows out of the fact that the Ada Elmore title has been brought in issue. The Ida Elmore is the mine owned by the above company. The Camas No. 1, on the Gold Belt, is reported sold to Utah parties. The Comet mine, on Deer creek, at the head of Camas Prairie, is looking exceedingly well. The owners are Messrs. Shroeder, Hull, and Johnson.

STRIKE IN THE DICKENS.—*Challis Messenger*, April 2: The strike in the Charles Dickens within the past few days places the old mine again, after two years of lying dormant, where she had always belonged, among the first mining properties in the Territory. The water has been pumped from the lower level scarcely two weeks and development work only barely begun before a rich strike, which is unquestionable, is reported. The shaft, on what is known as the "rich vein," was sunk but three feet when a body of ore four feet in width and assaying from 80 ozs. to 1500 ozs. in silver and from one to three ozs. in gold, averaging up in the hundreds and with every indication of permanency, was uncovered; and the slight development in the shaft on the large, or heretofore low-grade vein, has disclosed ore almost equal in value to the ore in the other shaft and possessing a richness not heretofore claimed for the ore of the low-grade vein of the mine.

MONTANA.

THE MINING OUTLOOK.—*Anaconda Review*, March 31: The weather the past month has been more favorable for prospectors and a number of the boys have outfitted and left for the hills. It is too soon yet to look for any new strikes this season. About all the mining news we will get for a month is in relation to the further development of claims located last season and that have already received notice at our hands. There is still several feet of snow on Lost creek, and very little can be done toward opening the mines in that district for some time yet. In Oleson gulch the prospects are somewhat better, and work is now being prosecuted in the Silver Chain, the Stormway, and several other mines in their intermediate vicinity. It is rumored that there has been a very important strike in the Stormway, that the new vein is nine feet and runs very high. We have been unable to verify it, but do not doubt that there is a very fine ore there. C. E. Sawtelle and others shipped a car of iron ore to Butte last Monday which is to be used as fluxing at the Butte reduction works. The mine from which this car was taken is a new one located about five miles west of town. They have been working on it for some time, but owing to the bad roads have been unable to ship sooner. If this proves as good as is expected, it will result in the shipment of a carload per day to Butte. This season promises to be one of unusual activity in and about Cable, Silver Lake and Georgetown. The snow has hardly gone off enough to admit of much prospecting at present, but a number of hardy prospectors are on the ground waiting its going to commence operations. In the Blue-Eyed Nellie district work has commenced in earnest, and a number of claims which were located last fall are being thoroughly prospected. The Blue-Eyed Nellie continues to yield even more largely the fine carbonate ore for which it is so noted. The Boomerang is looking well and its owners are confident that they will soon be able to inform the public that it is second only to the Nellie. Work on the Lady Vincent will commence within a week. We were shown the other day some fine specimens of carbonates which had just been struck in a claim on the south side of Warm Springs creek about two miles west of town, which gives good promise.

NEW MEXICO.

HERMOSA.—*Black Range*, April 2: Work has commenced again on the Pelican-Eagle group, and leases have been let upon this group of claims, and the ore produced as in the past will be sent to Socorro for treatment. The Antelope has sent about 60 tons of ore to the concentrator at Hermosa. The concentrator will also treat the low-grade ores of the Embolite, Palomas Chief and Eagle. James Menefee's group of claims are rapidly becoming important. He has recently accomplished 40 feet of work on one of them. He is dumping ore in quantity; it consists of lead sulphide and carbonates. The new strike on Geo. Wolford's Homestake, assaying 710 ounces, shows a good body of ore on the sides of the north drift and in the face. Over 300 feet of work has been done on this property. Work has progressed favorably on the Humming-Bird, owned by Marshall & Stevens. In the different shafts and drifts there is a good showing of ore and another shipment of ore will shortly be made to Socorro. A strike of high-grade silver ore has been made on the Whaupack claim, owned by Grigg Titus and Eli Titus, the big cattleman of Denver, Colorado. This claim is situated on the same vein as the Metropolis. Ore is being sacked preparatory to shipping to Socorro. J. C. McCoy has bonded his Big Tree claim to H. B. Fergusson, and it will be added to the Grover Cleveland group, the property of Judge H. Brinker, W. F. Henderson, Lorian Miller, H. B. Fergusson, H. L. Warren and Thos. Smith.

Work on the Grover Cleveland progresses. The Palomas Chief is producing more ore than ever, and the new development gives great promise of the continuity of the ore bodies. From 10 to 15 miners are always engaged in extracting ore or exploring this property.

SOCORRO.—*Bullion*, April 2: C. A. Marriner is working his fraction claim in the Pueblo district. The carload of ore shipped last week by Richard Mansfield White from his Palomas Chief yielded 157 ounces silver and 6½ per cent lead. Teofilo Gutierrez & Co., of Canada Alamosa, it is said refused \$40,000 for their recently located gold claim at the south end of the San Mateo range in this county. C. N. Blackwell's prospect in the San Mateo range is turning out to be a valuable claim. The Cropping Rock returns 5½ ounces silver and a notable quantity of gold. The Graphic mine is shipping large quantities of silver-bearing galena ore to the Graphic smelter of this city by the carload, in addition to the usual supply of carbonate ore. W. B. Foster and J. S. Eddy are driving through to the antipodes in their Commercial Union shaft in the Socorro district. They are dumping free-milling pay ore and doing development work as well.

OREGON.

PROSPECTING.—*Jacksonville Times*, April 2: Much prospecting will be done this season. Prospectors are beginning to arrive from other sections. Thos. Lawrence is prospecting a promising quartz ledge near Gold Hill. H. D. Russell is working his diggings in Forest creek district and doing well. The prospects at Bybee & Hall's claim on Canyon creek, Josephine county, are very good. A windmill will be put in Rogue river, below Rock Point, by W. L. McClure, Wm. Stuart and others. Cornelius & Co.'s mill will soon be started up again and a new set of amalgamators will then be put in. Operations at Nauke, Bybee & Co.'s hydraulic mine near Kerville are progressing smoothly and a good result is promised. The continued warm weather has caused water to become scarce in placers, and some miners have already commenced cleaning up. Sherer & Judson, of Grant's Pass, who are interested in placer mines in the southern portion of Douglas county, lately added a giant and 400 feet of pipe. A Mr. Gamble, of San Francisco, has bonded the Hope mine on Wagner creek, of J. W. Walsh, for a limited period, and it is understood that operations at the mine will be resumed within a short time. Henry Knutzen, Henry Gregg, and Wm. Hinkle, who have been mining on Thompson creek, made good wages while water lasted, finding one piece worth \$14. The miners of Josephine county are promised an extended season, as snow fell to a great depth on the mountains in which the various streams of that section head. The road to Klippel & Baumele's mill is finished, and a large amount of excellent quartz which has been taken out of the mines in Jackson creek district will be bailed there and crushed. Al. Sturges, of Forest creek, has made a partial cleanup at his hydraulic mines on Jackass creek and took out nearly \$500.

UTAH.

STOCKTON DISTRICT.—*Cor. Salt Lake Tribune*, April 4: The Honerick Company started up its concentrating mill about two weeks ago and is running on its own and some custom ores. It has a large amount of milling ore, as well as first-class ore, in sight, and its shipments and dividends are likely to be considerably larger than last year. The Silver King, belonging to Alex. Niedringhaus, is putting new hoisting works on the Connor King claim, and has a good body of ore to ship as soon as hoisting works are complete. In the Calumet I hear they have cut a very good ore body on the 400-foot level, at the crossing of a north and south vein, the ore streak being over 7 feet thick of carbonates with galena mixed through it. It is a very strong-looking ore chimney and it is thought will prove up well, which is much to be hoped for, as the owners have spent considerable money in the camp. It is reported that the Fritz Hill Co. will put on a force of men and commence shipping. Several leasers will soon be shipping ore, notably among them J. T. Keegan on Cygnut, Keystone and Hercules claims; also L. Causey, who has worked so long and faithfully running a 500-foot tunnel to cut the old Mabel vein. There are many other promising prospects being worked. In Dry canyon the Hidden Treasure people are shipping considerable ore, and I hear have good bodies in sight; several other leasers are getting out some quantities. On the Ophir side the Consolidated people have cut a vein of carbonates and galena from two to three feet thick in the Grey-rock, and have over 100 tons on the dump. They will commence shipping soon. The Jim Fisk people have been shipping some and have a good body of ore. Other mines are getting ready to ship, and if a concentrator were to be built at Ophir it would help the camp very much.

REVIEW.—*Salt Lake Tribune*, April 1: The week has been one of remarkably fair and even weather, quite favorable for mining operations. No great event has marked the seven days. Movements of the metals have been fair, and ore has come down from the hills freely. The receipts of the week in this city, ending the 30th, inclusive, were \$108,612.04 in bullion and \$49,148 in ore, a total of \$157,760.04. For the week previous the receipts were \$158,739.66; of which \$108,424.60 was bullion and \$50,315.06 was ore. The Ontario output for the week was 31,470 fine ounces of bullion and \$808.13 ore sales, a total of \$39,508.13. On March 31st the Ontario pays its third dividend for the year, of \$75,000, or a total of \$225,000 in the three months. This is the 13th dividend in all, being an aggregate of \$3,150,000 in dividends. The Daily product for the week was six bars of bullion, \$774.28 fine ounces. No ore sales. Fine bar receipts for the week were to the value of \$46,711.18; base bullion, \$4275; gold bars, \$15,770; common lead, \$6345.36. The Hanauer smelter produced for the week, \$25,190 in bullion.

BULLION SHIPMENTS.—On the 25th of March the Ontario shipped 53 bars of bullion, containing 28,323.22 fine ounces of silver, and Thursday, March 31st, the shipment was 36 bars, containing 19,186.68 fine silver ounces; total, 89 bars, 47,509.90 ounces. The Marsac mill shipped on March 21st, 8 silver bars, containing 9417 fine ounces; March 26th, 6 bars, of 6957 fine silver ounces, and yesterday, April 1st, the shipment was 8 Daly bricks, of 8598 fine ounces; total for the 10 days 20 bars, 25,332 ounces,

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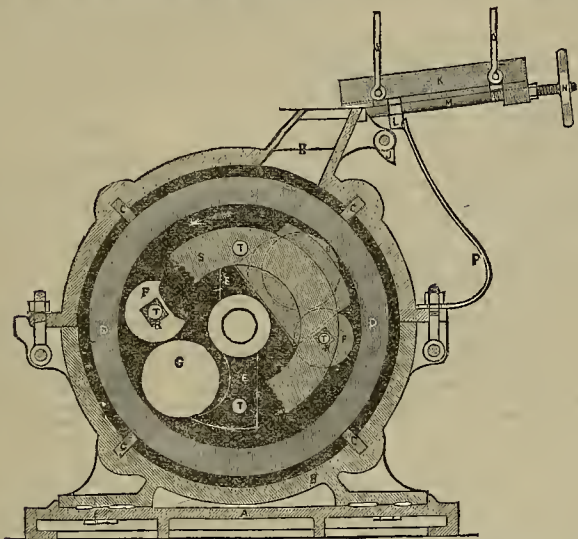
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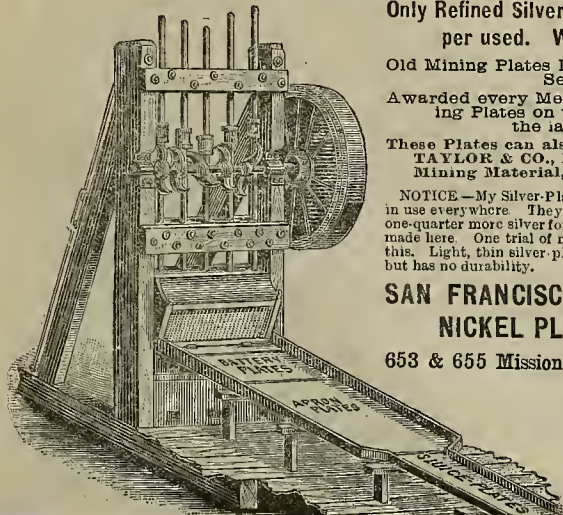
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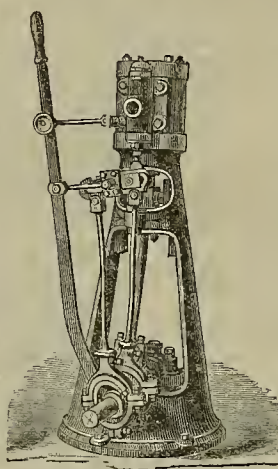
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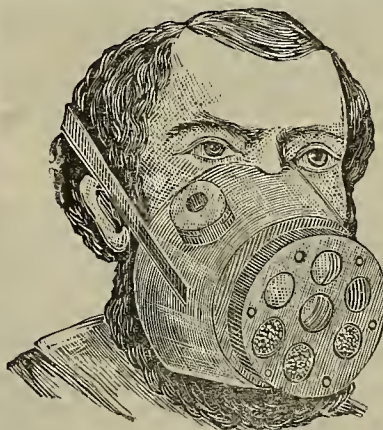
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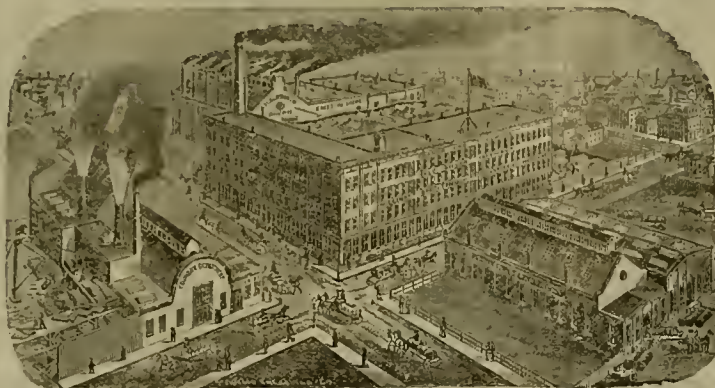
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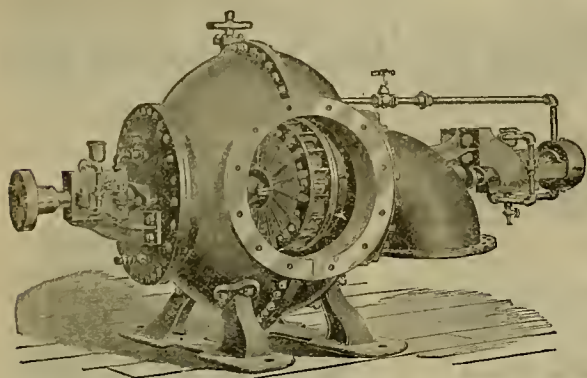
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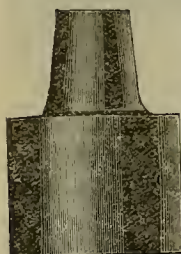
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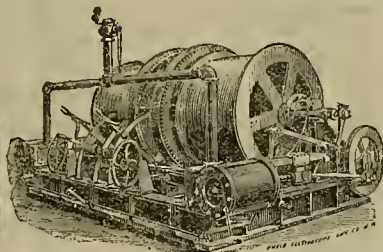
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FOR WEEK ENDING MARCH 29, 1887.

- 360,131.—FRUIT JAR—D. E. Ashby, S. F.
- 360,197.—STOVE—Mary E. Burnham, Santa Barbara, Cal.
- 360,299.—CHURN—O. Hilton, S. F.
- 360,309.—SPRING SCALES—L. Langdon, Stockton, Cal.
- 360,195.—FRUIT-JAR COVER—L. P. R. LeCompte, Portland, Ogn.
- 360,232.—ANIMAL EXTERMINATOR—W. H. Leininger, Salem, Ogn.
- 360,361.—GRAIN CLEANER—L. Prevost, Champoug, Ogn.
- 360,050.—SHEAVE BLOCK—J. H. Redmond, S. F.
- 360,328.—LAMP EXTINGUISHING—A. A. Schafflin, Santa Barbara, Cal.
- 360,118.—ADDING MACHINE—B. F. Smith, Sacramento, Cal.
- 360,185.—CHROMATIC PRINTING APPARATUS—Wheeler & Schuch, S. F.
- 360,077.—RAILWAY SIGNAL—Geo. H. Wright, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Mining Share Market.

Business is very light in the stock market, everything being rather dull. Up on the Comstock the miners are working away diligently. In the Savage they have found some rich ore in the upraise from the 500 to 600 levels, and on the 800 level the outlook is favorable. On the Chollar, work has been resumed in the Sharon shaft. In Con. California and Virginia, explorations are going on and ore is being extracted. The Virginia Enterprise says: There is nothing discouraging in any part of the mine; on the contrary, there are some encouraging features of which something will probably be heard in due time. Arrangements are being made to float that section of the old works in which a smoldering fire has for years existed with carbonic acid gas. This gas being heavier than air, will, when introduced, sink to the bottom of that portion of the mine which is pent up by bulkheads. Enough of the smothering gas will be introduced to fill all the space to and above the fire, which will then be drowned out just as by water, though much more effectually, and without the slime, caving and other disadvantages incidental to the introduction of water. At the south end of the Comstock the outlook is good. At the Haywood, which lies directly to the south of the lower end of Gold Hill, a great amount of ore is opened up and ready for extraction. Two mills are now running on Haywood ore, and a third will start up in three or four days.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court Department to, San Francisco:

CANDUS M. Co., April 2. Capital stock, \$400,000. Directors—T. E. Luty, W. B. Murdock, T. E. Jewell, D. B. Arthur, and John Henderson.

COLUMBIA RIVER PACKING CO., April 5. Object, canning and preserving salmon and other fish. Directors—Thomas Cutting, N. W. Tallant, Sidney M. Smith, A. D. Cutler, and F. Hobron. Capital stock, \$100,000.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Argus, April 2, \$3314; Bannock, March 26, \$1300; Hanauer, 26, \$5700; 27, \$7200; Bannock, 30, \$2800; Hanauer, 30, \$2090; Alice, April 1, \$4844; Hanauer, 1, \$1600; Silver Reef (for March), \$16,476; Hanauer, 2, \$1800; 3, \$5420. Wells, Fargo & Co. received at Salt Lake last week in bullion \$75,594; McCormick & Co., \$75,820; T. R. Jones & Co., \$5345.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

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OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARRO G. HOAG—California.
G. W. INGALLS—Arizona.
E. L. RICHARDS—San Diego Co.
Geo. McDOWELL—Tulare Co.
A. J. HANE—El Dorado Co.
J. L. DOYLE—Mariposa Co.
W. J. FREEMAN—Yolo Co.
CHAS. LEST—Alameda Co.
T. C. STARR—San Bernardino Co.
S. J. LITTLEFIELD—San Diego Co.

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ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Baker Divide M Co.	California.	13.	25.	Mar 19.	Apr 19.	May 9.	D. M. Kent.	330 Pine St
Best & Belcher M Co.	Nevada.	35.	50.	Mar 5.	Apr 15.	May 5.	L. Osborn.	309 Montgomery St
Bodie Tunnel M Co.	California.	14.	25.	Mar 2.	Apr 27.	May 20.	C. O. Harvey.	309 California St
Caledonia M Co.	California.	42.	15.	Mar 1.	Apr 5.	May 2.	C. S. Gouth.	415 California St
Camp Creek Placer M Co.	California.	1.	10.	Jan 20.	Mar 10.	Apr 14.	G. W. Miller.	306 Pine St
Comstock M Co.	Nevada.	3.	15.	Mar 14.	Apr 18.	May 15.	A. E. Ball.	309 California St
Con Washoe M Co.	Nevada.	2.	10.	Mar 24.	Apr 28.	May 14.	F. MacEwen.	314 Montgomery St
Dolores Con M Co.	Nevada.	4.	05.	Mar 2.	Apr 11.	Apr 23.	R. N. Van Brunt.	318 Pine St
Florida M Co.	California.	1.	1c.	Mar 16.	Apr 18.	May 7.	T. J. Mitchell.	Grass Valley
Gover Improvement Co.	California.	2.	10.	Feb 28.	Apr 5.	Apr 25.	R. N. Van Brunt.	318 Pine St
Gould & Curry M Co.	Nevada.	55.	50.	Mar 8.	Apr 11.	May 4.	A. K. Durbin.	309 Montgomery St
Hale & Norcross M Co.	Nevada.	33.	50.	Mar 9.	Apr 14.	May 4.	J. F. Lightner.	339 Montgomery St
Inyo Marble Co.	California.	1.	01.	Mar 15.	Apr 18.	May 9.	C. F. Von Rehm.	324 California St
Livermore Oil Co.	California.	1.	05.	Mar 8.	Apr 12.	May 2.	H. Deas.	339 Montgomery St
Mayflower G. C. M Co.	California.	25.	25.	Mar 23.	Apr 25.	May 15.	J. Morizio.	328 Montgomery St
Maunhattan M Co.	Nevada.	5.	1.00.	Mar 23.	Apr 25.	May 10.	J. Crockett.	327 Pine St
Monro M Co.	California.	23.	50.	Mar 31.	May 5.	June 2.	G. W. Sessions.	309 Montgomery St
Nevado M Co.	Nevada.	1.	25.	Mar 14.	Apr 27.	May 13.	W. P. Pew.	310 Pine St
Nevada Queen M Co.	Nevada.	2.	50.	Mar 10.	Apr 14.	May 6.	H. Deas.	309 Montgomery St
North Belle Isle M Co.	Nevada.	12.	30.	Mar 14.	Apr 19.	May 11.	J. P. Pew.	310 Pine St
Potosi M Co.	Nevada.	37.	30.	Mar 9.	Apr 14.	May 4.	C. E. Elliot.	309 Montgomery St
Richfield M Co.	California.	3.	12.	Mar 9.	Apr 15.	May 12.	G. L. Lansing.	4th and Townsend St
Savage M Co.	California.	5.	50.	Mar 10.	Apr 12.	May 2.	E. B. Holmes.	309 Montgomery St
Sierra Iron Co.	California.	5.	2.50.	Feb 17.	Mar 30.	Apr 23.	H. P. Bush.	431 California St
Union Con M Co.	Nevada.	35.	25.	Mar 31.	May 5.	May 25.	J. M. Burlington.	309 California St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Bulwer Con M Co.	California.	L. Osborn.	334 Montgomery St.	Annual. Apr 13
Diana M Co.	California.	P. J. Flanagan.	318 Pine St.	Special. Apr 11
Herbert Concentrator Co.	California.	M. Livingston.	230 Montgomery St.	Annual. Apr 12
Plumas Con M Co.	California.	A. Halsey.	328 Montgomery St.	Special. Apr 9

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50.	Mar 4
Marina White M Co.	Nevada.	J. J. Scoville.	309 Montgomery St.	25.	Dec 20
Original Hidden Treasure.	Nevada.	D. A. Jennings.	401 California St.	13.	Apr 4
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	10.	Nov 30
Pacific Borax, Salt & Soda.	California.	A. H. Clough.	431 California St.	10.	Apr 7
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Mar 15

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar. 17.	WEEK ENDING Mar. 24.	WEEK ENDING Mar. 31.	WEEK ENDING Apr. 7.
Alpa.	4.25	54	3.50	4.50
Alta.	2.40	2.50	2.05	2.35
Andes.	1.25	1.53	1.10	1.39
Argentine.	1.00	1.20	1.00	1.15
Belcher.	3.25	3.70	2.50	3.70
Brophy.	10	12	7 1/2	9 1/2
Best & Belcher.	10	12	7 1/2	9 1/2
Bullion.	2.70	3.20	2.30	2.95
Baltimore.	1.00	1.20	1.00	1.15
Belle Isle.	1.00	1.20	1.00	1.15
Bodie Con.	2.85	3.00	2.00	2.80
Benton.	.75	.95	.65	.80
Bodie Tunnel.	1.30	1.45	1.25	1.50
Bulwer.	.75	.95	.65	.80
Con. Va. & Cal.	.75	.95	.65	.80
Challenge.	2.80	4.00	2.50	2.50
Champion.	.75	.95	.65	.80
Confidence.	.75	.95	.65	.80
Con. Imperial.	.75	.95	.65	.80
Caledonia.	.35	.75	.45	.60
Con. Pacific.	.35	.75	.45	.60
Crown Point.	4.25	4.50	3.70	4.25
Crocker.	3.50	4.00	3.00	3.50
Central.	.70	.75	.60	.65
Dudley.	1.40	1.45	1.35	1.40
East B. & B.	1.40	1.45	1.35	1.40
Exchequer.	1.70	2.10	1.60	2.10
Grand Prize.	.70	.75	.60	.65
Gould & Curry.	5.25	6.00	4.40	5.50
Hale & Norcross.	5.25	6.00	4.40	5.50
Holmes.	.35	.75	.45	.60
Independence.	.35	.75	.45	.60
Iowa.	.80	1.10	.80	.95
Julia.	.50	.75	.50	.60
Justice.	1.50	1.85	1.50	1.85
Kentuck.	1.50	1.85	1.50	1.85
Lady Wash.	.55	.70	.45	.50
Marina White.	2.65	2.80	2.10	2.15
Monro.	6.00	7.00	5.50	6.25
Mexican.	6.00	7.00	5.50	6.25
N. Dial.	.40	.45	.35	.40
N. Northern Belle.	.85	1.00	.80	1.15
Nevado.	.85	1.00	.80	1.15
North Belle Isle.	4.80	5.15	4.00	5.00
Nias R.	1.25	1.70	1.20	1.50
Northern.	3.50	4.00	3.00	3.50
North G. & C.	3.50	4.00	3.00	3.50
Occidental.	3.50	4.00	3.00	3.50
Ophir.	1.25	1.50	1.00	1.25
Overman.	1.20	1.25	1.00	1.25
Potosi.	.85	1.10	.80	.95
Peerless.	.50	.65	.45	.55
Peer.	.40	.45	.35	.40
P. Sheridan.	.10	.10	.10	.10
Silver Star.	5.50	6.00	5.00	5.50
Savage.	5.50	6.00	5.00	5.50
Seg. Belcher.	1.00	1.00	1.00	1.00
Sierra Nevada.	4.80	5.25	4.15	5.00
Silver Hill.	.40	.45	.35	.40
Silver King.	.95	1.00	.80	.95
Sydney.	.25	.25	.25	.25
Syndicate.	3.95	4.53	3.50	4.10
Union Con.	1.55	1.80	1.25	1.55
Utah.	1.55	1.80	1.25	1.55
Yellow Jacket.	5.50	6.00	5.00	5.50

Sales at San Francisco Stock Exchange.

THURSDAY Apr. 7, 1887.	100	500	1000
250 Alta.	2.10	2.10	2.15
400 Andes.	1.00	1.00	1.00
150 Argenta.	1.00	1.00	1.00
200 B. & B.	1.00	1.00	1.00
200 Bullion.	2.00	2.00	2.00
250 Bodie Con.	2.20	2.20	2.20
255 Belcher.	2.95	2.95	2.95
200 Baltimore.	80	80	80
100 Belle Isle.	1.00	1.00	1.00
200 Booker.	1.00	1.00	1.00
100 Bulwer.	1.15	1.15	1.15
100 Chollar.	.65	.65	.65
300 Con Va. & Cal.	1.35	1.35	1.35
250 Crown Point.	4.00	4.00	4.00
50 Dudley.	.25	.25	.25
100 Exchequer.	1.40	1.40	1.40
505 Gould & Curry.	2.90	2.90	2.90
300 Hale & Norcross.	3.50	3.50	3.50
300 Independence.	.50	.50	.50
100 Julia.	.40	.40	.40
100 Kentuck.	.15	.15	.15
175 La Panta.	1.80	1.80	1.80
400 Mexican.	3.85	3.85	3.85
300 Nevada.	1.35	1.35	1.35
100 Nevada.	.90	.90	.90
500 Nev. Queen.	1.90	1.90	1.90
100 N. Belle Isle.	.51	.51	.51
500 Nipmuc.	.50	.50	.50
100 Potosi.	.70	.70	.70
500 P. Sheridan.	.05	.05	.05
100 Peerless.	.50	.50	.50
350 Savage.	4.80	4.80	4.80
200 Sierra Nevada.	2.00	2.00	2.00
200 Scorpion.	.55	.55	.55
100 Syndicate.	1.00	1.00	1.00
150 Seg. Belcher.	1.10	1.10	1.10
570 Union Con.	2.20	2.20	2.20
200 Hale & Norcross.	3.50	3.50	3.50
500 Weldon.	1.10	1.10	1.10

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DELINQUENT NOTICE.

Gover Improvement Company.—Location of principal place of business, San Francisco, California. Location of works, Amador County, Cal. NOTICE.—There are delinquent, upon the following described stock, on account of Assessment No. 2, levied on the 23rd day of February, 1887, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Am't.
Eugene Dutilh.	3	10	\$100 00
Eugene Dutilh.	46	5	50 00
J. C. Haelton.	36	10	100 00
A. Ogden.	1	10	100 00
A. Ogden.	45	5	50 00

And in accordance with law, and an order of the Board of Directors, made on the 23rd day of February, 1887, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of said Company, on Tuesday, the 26th day of April, 1887, at the hour of 3 o'clock p. m., of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of the sale.

R. N. VAN BRUNT, Secretary.

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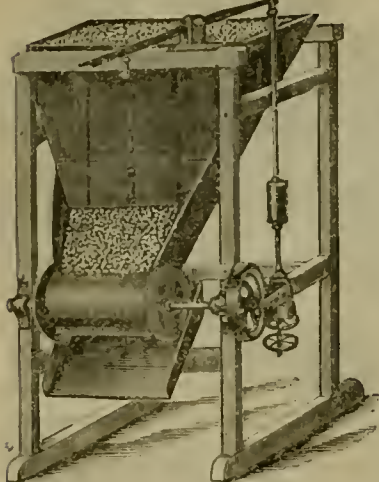
New York Metal Market.

Telegraphic advices dated April 6th give the following New York prices:

BAR SILVER—93 1/2c per oz.
SILVER—54 1/2c.
COPPER—LARK—\$10.40.
IRON—No. 1, \$22.00.
LEAD—\$4.30 @ 4.35.
QUICKSILVER—63 @ 64c.
The following is the latest by mail from the "New York Metal Exchange Market Report":
Copper—Neglected, spot closing at \$10.35 @ 10.50. Transferable Notices (Lake) issued at \$

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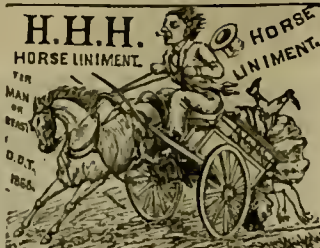
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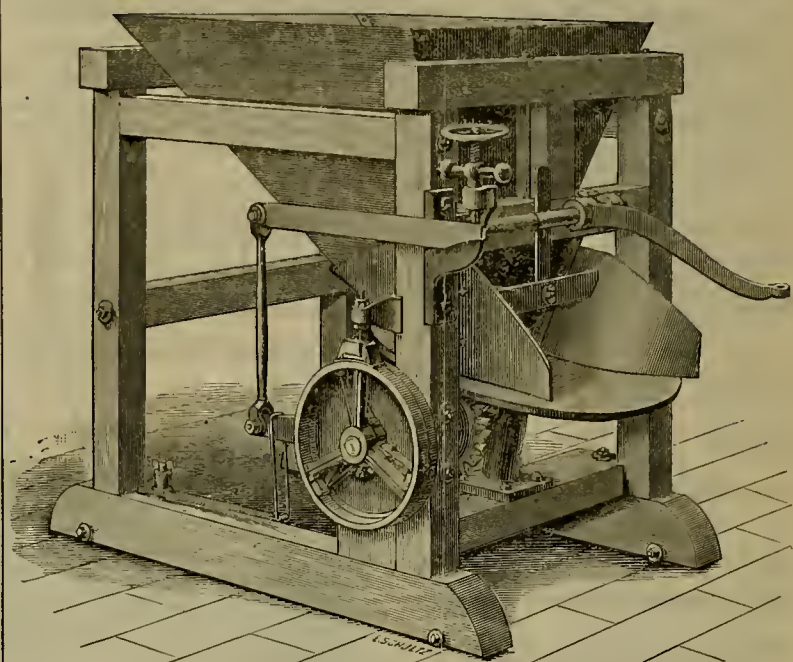
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W. G. ROBERTS, Greenwood, El Dorado Co., Cal. J. R. TREGLOAN, Supt. South Spring Gold Mining Co., Amador City, Cal.

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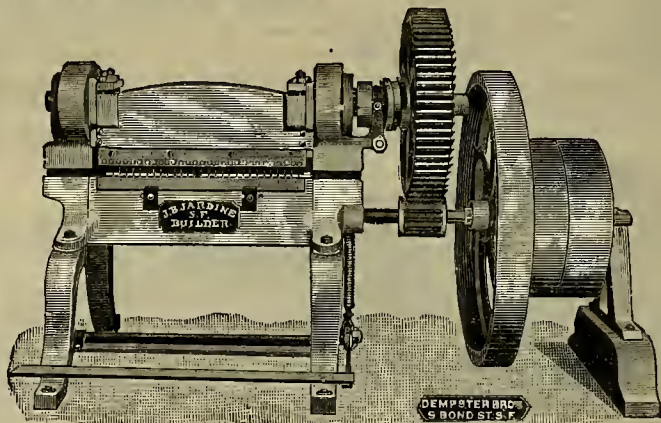
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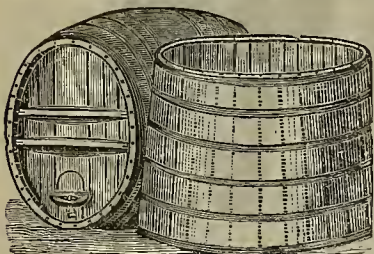
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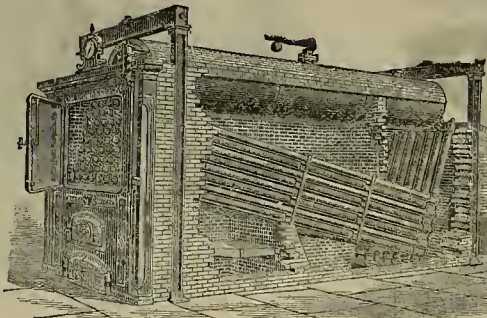
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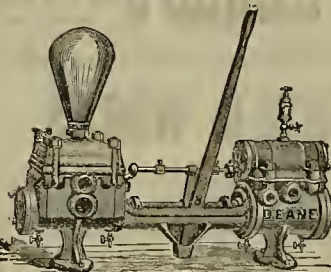
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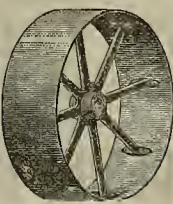
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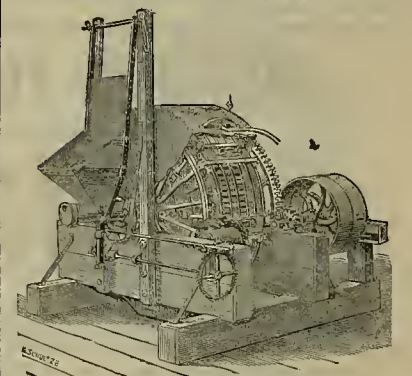
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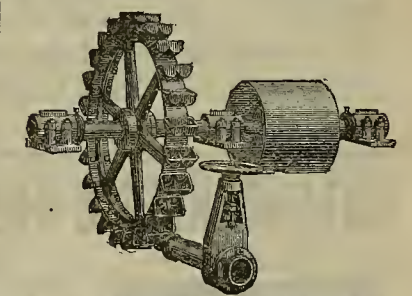
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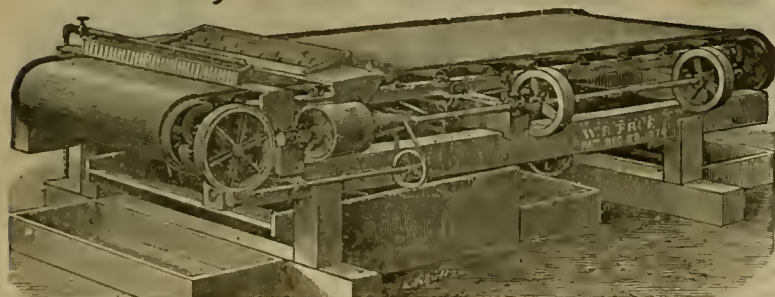
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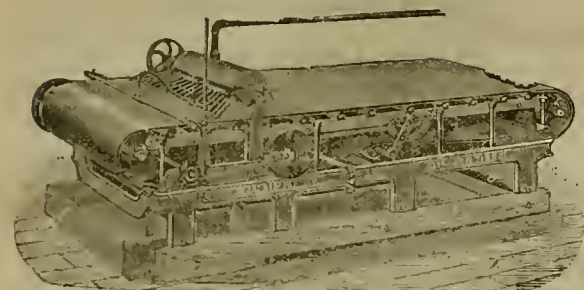
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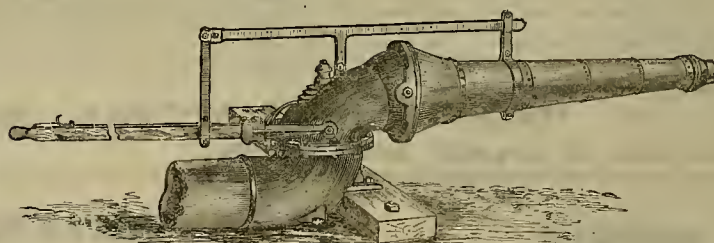


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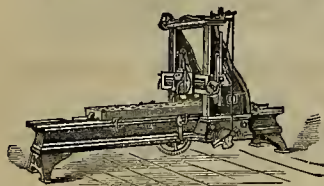
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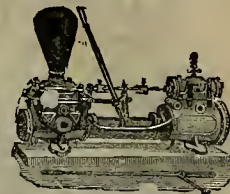


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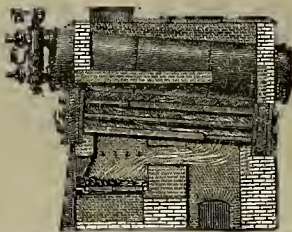
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MESSRS. ALDEN, SAMPSON & CO., OF NEW YORK, say: "The 200 and 350-horse power Hazelton Boilers which we have at our Works at New town, N. J., as well as the 40-horse power in use at our factory at Hallowell, Maine, are giving good satisfaction. We consider them very economical in fuel, easily kept clean, rapid producers of an abundance of dry steam, and perfectly safe."

THE JERSEY CITY STEEL COMPANY, of Jersey City, N. J., are using two 100-horse power, utilizing the waste heat from flue boilers. The Manager says: "Each Boiler gives us from this waste product nearly 100-horse power, after passing through a 30-foot Flue Boiler. They require no repair, we experience no trouble in keeping them clean, and they are every way satisfactory. The quantity of fuel to produce a given result is decidedly less than any Boiler we have ever used."

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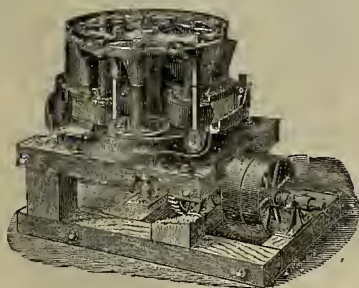
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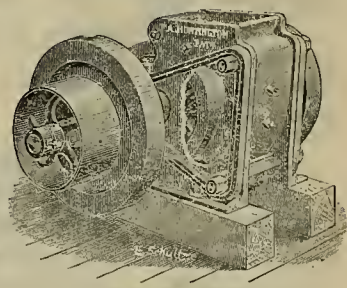


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VOLUME LIV
Number 16.

Saving Slimes.

Concentration of ores is simply the separation of the heavy from the light, and is performed sometimes on dry ore, but generally water is used, and especially in California, where it is practiced principally on ores of gold and silver. Occasionally the lightest—or finest—part of the crushed ore is very rich, and is worth saving by itself. In dry concentration this is the dust. In wet concentration this light portion is the slime, and, if rich enough to be saved, the pulp is passed through a pointed box.

The slimes pass off from the top, to be settled and saved, the balance discharging from the bottom to the concentrator for separation and saving of the mineral. In some cases it is preferable to put the pointed box below the concentrator, and thus separate from the tailings, and save the rich slimes. As a rule, however, most of the money in the slimes exists as finely divided sulphurete, which are caught and saved with the balance of the sulphurets by the best concentrators, so that there then is only an occasional ore the slimes of which need segregation and saving.

Mr. J. M. Adams gives, in the last report of the State Mineralogist, the following description (with engravings) of the pointed box:

Several forms are in use. Their dimensions vary according to the duty required. In some cases it is desired to save and settle together all the pulp, including the slimes, when there is too much water present for subsequent concentration. In such event the pointed box should be about 6 feet deep, and 3 feet by 7 feet at the top, the longest sides sloping till they meet at the bottom.

Such a box will settle and save about 6 tons of ore in 24 hours, discharging it automatically and continuously from the bottom by a siphon hose, with the proper amount of water for subsequent concentration.

This form is used when the tailings from pan amalgamation are to be concentrated, after leaving the settlers and agitators, for they contain a large excess of water, which must be gotten rid of, so that the tailings are of

the proper consistency for concentration.

The accompanying cut shows a form of point box used in cases where the slimes are to be separated from the pulp and saved. Each box is 40 inches square at the top, and 40 inches deep, coming to a point at the bottom; and one box will handle from 6 to 10 tons of pulp in 24 hours, making a good separation.

The pulp from the battery, entering the box

uses in place of the hollow wooden plug shown, a $1\frac{1}{2}$ inch iron tee with one end plugged, and with three-fourths inch side outlet, attaching the siphon hose by nipple.

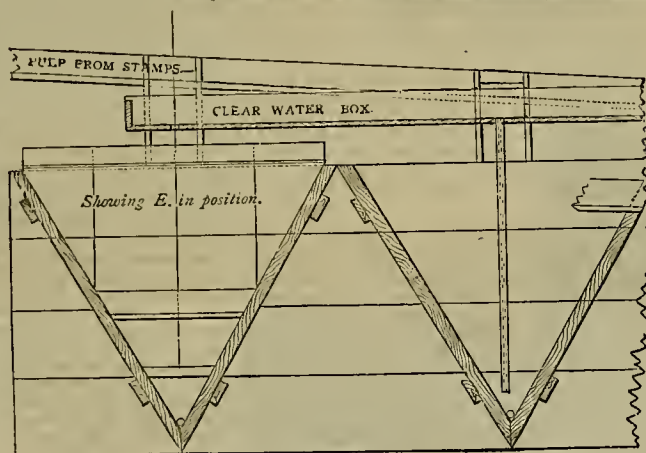
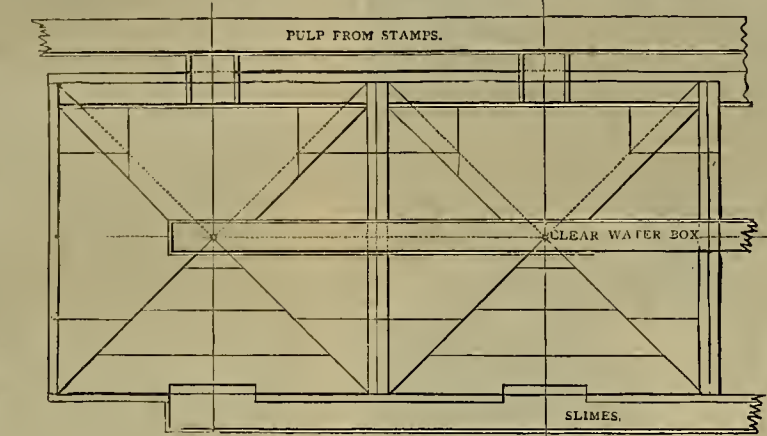
The care to be used on the new cable road on Powell street, in this city, are both strong and ornamental, being constructed after the style of those in use on the Market-street system,

Arguing an Issue that Has Never Been Raised.

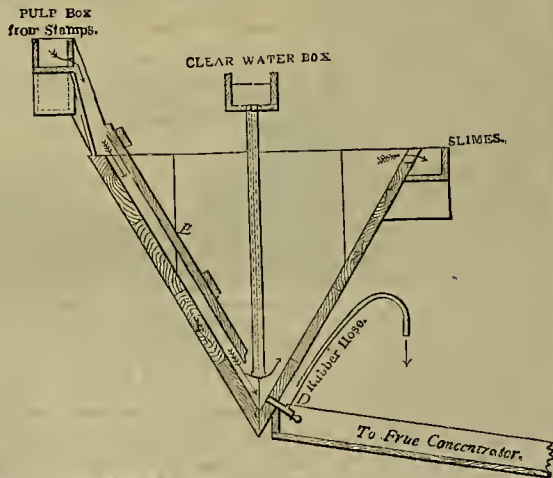
It is curious to observe how a combat will sometimes be waged against an idea that is itself the mere figment of the writer's brain, the assertion that mining is a legitimate industry furnishing a case in point. There is a class of writers who, whenever anything is said against the wrongful methods by which mining is sometimes carried on, at once begin to asseverate that the business is legitimate, iterating and reiterating this assertion as often as occasion may seem to require. Now, this arguing the legitimacy of mining appears to us to be altogether a work of supererogation, inasmuch as it does not appear to have ever been called in question. There has been a great deal written, and very properly, in denunciation of the abuses and frauds committed in connection with mining, but these strictures are not to be mistaken for attacks upon the business itself, which, as far as we know, has never been arraigned on the charge of illegitimacy.

This apologetic style of arguing in defense of mining should be abandoned as implying that it really may be attacked on the ground of its unlawfulness. What would be thought of the agricultural journalist, who, to any just criticism on the evils of gambling in wheat, should enter into a serious disquisition on the lawfulness of raising that cereal? That villainies innumerable and of the worst kind have been perpetrated in the name of mining, cannot be denied. They have been not only illegitimate but infamous. But this malfeasance has had no more to do with the business of mining proper than with preaching the gospel of the new dispensation. It will be time enough to contend for the legitimacy of mining when the idiot disposed to raise that question shall put in an appearance. There is no use of contending for what is universally conceded nor arguing an issue that has never been raised.

THE Silver King Mining Co., of Arizona, produced 853,187 ounces of fine silver in 1886, and paid \$220,000 in dividends.



POINTED BOX FOR SAVING SLIMES IN CONCENTRATING.



at the top, is confined by partition E, until it passes into the box proper, near its bottom. Clear water is conveyed from above through a half inch pipe, which delivers it into the box at the bottom. Care must be taken that this pipe is kept full, so that no air bubbles are caught through it, as they create agitation, and cause sand, etc., to pass off with the slimes.

The amount of clear water needed varies, so it is a good plan to have a cock in the pipe just below the clear water box, or else partially close, with a wooden plug, the opening of the pipe in the clear water box. At D is a hollow plug, and to it is attached a piece of hose, which is used as a siphon, so that the pressure is lessened and too violent discharge of the pulp is prevented.

Without the siphon hose, two-eighths inches opening would not be too small, while with it three-eighths inches opening is about right, and the end of the hose is plugged accordingly. Inasmuch as foreign coarse material occasionally gets into the box (prevented as much as possible by a screen over the top), it is advisable to

both dummy and conpe being made in one. They are to be 28 feet in length over all, and will have curtains at the windows instead of blinds. The roof will be laid in panels of Lin-crusta Walton. Electric lights will afford the illumination at night. There will be no water-ehed, as it will be caught and carried off in pipes. Wire guards will protect the public from the wheels of the vehicle, and the forward etanchions being left out will make the dummy more accessible.

THE people at Anaconda, M. T., are indignant that a dispatch giving the details of a plot to take possession of J. B. Haggin's great smelting plant at that place by force of arms, apply the torch to \$1,000,000 worth of property and assassinate the officers of the company, has been sent abroad. The story is declared to be a wicked and malicious fabrication.

MANY miners are leaving Juneau, Alaska, for the Yukon and Stewart river mines. It is said the best diggings have been discovered on Forty-mile creek,

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EBS.

The Cargo Muchacho Mines.

Sketch of a Southern California Mining District.

EDITORS PRESS:—I have just returned from an examination of the mines in the Cargo Muchacho range. The district lies about 12 miles north of Yuma, in this State, and six miles from the nearest point on the Southern Pacific. The station from which all supplies are shipped to the mines is called Ogilby.

The Cargo Muchacho mountains rise like an island in the sea of sand which stretches for miles in the southeast corner of the State. The landscape is dreary and uninviting in the extremes. Wood is scarce, and water is still more so. A healthful climate is all of which the inhabitants of that region can boast, as far as comfort and conveniences are concerned. The mountains are, I should say, 20 miles in length and from three to five miles wide, with a northerly and southerly trend. They consist entirely of metamorphics, there being no igneous rock except an occasional bed of lava, the vent of which, owing to limited time, I failed to discover.

The rocks are full of veins of quartz varying in width from an inch to several feet, and are for the most part simply lenses of barren rock, though occasionally they contain iron oxides and copper carbonates, and when this is the case a prospect can usually be obtained.

There are, however, several fissures which have considerable continuity, and which have developed in depth all the characteristics of true fissures.

These veins, of which the Cargo Muchacho is the most extensively developed, are gold-bearing, and some of the quartz is rich, showing much free gold. As this mine is the largest and richest in the district, a short description of it will suffice for all of the fissures. At the surface it was but a foot or 18 inches in width, but as depth was attained it was found to pinch and swell like most fissures. In many places the vein exhibits a distinctly handed structure, and the walls are well defined throughout. The vein traverses a belt of hornblende schist, which in places gives place to chlorite schist—formed from a decomposition of the hornblende. Talose and clayey matter constitute a gouge, which in a few instances completely fill the fissure, but forming an infallible guide to other ore bodies.

The mine is opened to a depth of 378 feet, I was told. Most of the ore lying above the 200-foot level has been stoped out and milled in a mill situated some eight miles distant on the Colorado river. The ore milled averaged \$12 to \$14, and paid something in dividends; but poor management has thrown the property into disrepute, and it now stands idle. It is the opinion of those best acquainted with the operations, as carried on there, that the mine can be worked to profit.

The lowest levels of the mine show from 5 to 8 feet of ore of good grade, better, in fact, than much that was stoped from the upper portion of the vein. It is perfectly free-milling, specimens of bright gold not being uncommon. As yet, there is but little sulphide in the rock. The gangue consists principally of quartz, with some calcite and feldspar. It is extensively mineralized, carrying iron oxides in large quantity, and also showing copper carbonates. Occasionally, orange-red crystals of wulfenite can be found and another mineral which I take to be a decomposition of zinc-blende. I found neither zinc-blende nor galena, but the presence of the wulfenite leads me to believe that, when the sulphide ore is encountered, galena will be found, together with iron and copper pyrites, and doubtless, also, chalcopryite, as it is beyond question from these latter that the iron oxides and malachite originate.

Other veins in the neighborhood show much the same characteristics at the surface as the Cargo Muchacho, and may possibly in time become productive.

Of course, the district is sadly handicapped, being located in the midst of a desert, but the confidence which the prospectors have in their mines, and their determination to develop them, may yet result in bringing them to the front.

The Rich Rock mine is located in the northern part of the range, and I did not visit it, as my business did not call me there; but I was told that the vein was large but of low grade.

The Padre y Madre mine lies in a valley at the western base of the range, and but little over a mile distant from the Cargo Muchacho mine. A score of shafts have been sunk in the flat, and many hundreds of tons of ore extracted and milled, but with what results I could get no satisfactory information. At any rate, all operations for the time being are suspended.

I am of the opinion that some of the mines of the district could be worked profitably, if properly managed, because, in the face of so many disadvantages, it is necessary to work with the strictest economy and care.

There is a silver district located in another range of mountains, about 20 miles to the northward, but I know nothing of them. The ore which was shown me consisted principally of carbonate of lead, and was said to carry about \$30 in silver.

There are several prospectors working dry

placers in the Cargo Muchacho district, but the result of their labors would tempt few to join them.

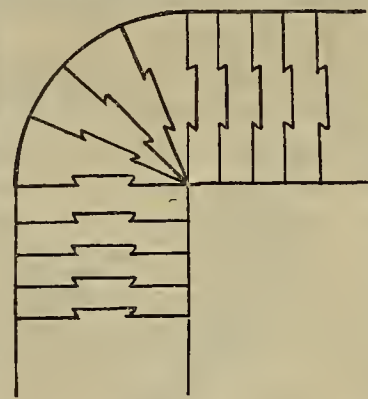
Considerable work has been done at various points in the range on large ledges of copper-bearing rock. The ledges are simply huge hands of quartzite in which the copper occurs as an impregnation. Occasionally, segregated bunches of the ore are quite rich in copper, but the rock carries little of the precious metals.

I cannot say, during a week's sojourn in the wilderness, that I formed a very strong attachment for the place, though I believe it has a brighter future than its past history would indicate.

W. H. STORMS.

Construction of Fortifications.

EDITORS PRESS:—There is being manifested at this time on the part of the Government a disposition to put the seaboard cities of our country in a better defensive condition. General Sheridan has proposed the establishment of sunken batteries for the protection of harbors. Such a system of defense would prove entirely inefficient from the impossibility of operating guns in such structures of sufficiently heavy caliber to be effective against the iron-clad ships of other nations. Another serious defect in such a system as that is the entire absence of any protection from shells, either for the guns or the men operating them. Ramparts of earth and revetments of wood or masonry are obsolete and entirely unfit for permanent fortification at this day. In the present state of military science, all defensive works of a permanent character must be constructed of iron or steel. Captain Ericsson has recently proposed the plan of erecting furnaces on the immediate spot, and casting the walls of a fort solid in place where they are to stand. This method of construction, if at all practicable, would certainly prove a very costly one. I propose a plan which I think would produce a structure equal in efficiency with what might be accomplished by Captain Ericsson's method, and at less expense of construction than by any system of erecting iron or steel armor now in use. In illustration of my plan is a sectional view in profile of the top of a wall in the angle of a square redoubt, to be composed of plates of Bessemer steel, each one being cast with a dovetail projection on



one side, with a corresponding cavity directly opposite on the other. In this process of erection a plate would be set on end on a suitable foundation, in the proper position for the beginning of the wall. Then another plate would be hoisted in a vertical position until the dovetail projection at its lower end was inserted in the corresponding cavity in the standing plate, when it would be allowed to descend to the same level. That operation would be repeated until the structure was completed. Then, or while the process of setting up was going on, the interstice between the plates would be filled with molten metal, either of the same kind of steel or some more fusible metal, thus making it practically a solid steel wall without the use of either bolts or rivets.

The profile represents a wall of two feet in thickness, composed of plates four inches thick. But the thickness of the wall may be increased or diminished, the only consideration necessary in that respect being the cost of the crude material, and the thickness of the plates would be determined mainly by regard to convenience in handling. Permanent fortification barriers of any practical utility must be built of iron or steel, in the form of redoubts, casemated battery shields or isolated revolving turrets. The plan which I propose may be readily adapted to all those forms, and in cheapness, facility of construction and effective durability will, I think, compare favorably with any others now in use or heretofore proposed.

San Francisco, April 4th.

ANON.

Detonating Meteorites.

EDITORS PRESS:—The article in the PRESS of the 2d inst., on the "Explosion of Meteorites and Causes of Thunder," by Mr. Hirn, from a late number of *Nature*, has established the true physical cause of a wonderful phenomenon which occurs so seldom as to be thought by many to be mythical. It has been my fortune to witness such an occurrence only once during a long life. The locality was at Carhilo, in

Meadow Lake Mining District, near the summit of the Sierras.

At 10:30 o'clock on a clear and warm evening, about the middle of September, 1867, there were gathered on the plaza around a camp-fire of packers a few miners and myself, when suddenly the whole scene was illuminated with a glare of light. The cause was quickly discerned to be a glowing aerolite apparently as large as a football, in the west, at an altitude of about 25°, passing with great velocity from the south to the north on a descending angle of about 10°. It was visible about four seconds, and passed out of sight behind a western spur of the "Old Man Mountain;" during which time, according to the estimate of the mean velocity of meteorites penetrating air, by Hirn, it passed the distance of 96 miles at the rate of 31 miles per second, or nearly double the speed of the earth in its orbit around the sun. In a little less than one minute from the appearance of the meteor, a concussion and roar, as of the loudest thunder, struck our ears and shook the buildings of the town, and every person in bed was aroused and soon on the plaza wondering at the commotion. The rolling, rumbling sound like thunder continued over 3½ minutes, but not with the same intensity as during the first few seconds.

We can calculate the distance of its nearest approach by the time intervening between the sight and sound. If we assume that the average temperature through which the sound passed was 33° F., it traveled at the rate of 1100 feet per second, and in one minute a little over 12½ miles, and continuing for 3½ minutes, it was heard a distance of nearly 50 miles on each side of the nearest point.

It can be readily perceived why the first shock was so intense. The angle is so light from the point of hearing to a distance of four miles on each side of the nearest point of approach that it would make a difference of only one mile in the distance the sound traveled to the point of hearing, and hence the whole volume of sound produced in eight miles of the meteor's flight was condensed and precipitated at that point in less than five seconds.

This meteorite was observed in many places in the valley and foothills and described in the newspapers, but no mention made of the detonation.

J. E. SQUIRE.

Calico Mines.

EDITORS PRESS:—The mining outlook is still good in the southern part of California. The King Company, at Calico, are building a 60-stamp mill with 800-pound stamps near Daggett for a mine known as the Waterloo. This mine is situated on the edge of the mountain three miles west of Calico, near the plains. The vein is in quartzite formation. At a depth of 100 feet the vein is 20 feet wide. The rock is very dark and hard, but shows plenty of horn or wax silver. The vein runs along the southwest base of the Calico hills. Easterly half a mile is a place on the same vein evidently, owned by Barber & Co., and known as the Total Wreck. There is a 200 foot tunnel, and they have sunk 75 feet on a vein of fine milling ore. East Calico has also a good strike of high-grade silver ore. In the Josephine mine, rich ore has been found. Many chlorides are busy on other prospects. One party is prospecting the old King ground, and there are better prospects ahead.

S. P. BLADE.

Calico, San Bernardino Co.

NATURAL GAS IN UTAH.—Natural gas is now being used at the salt works at Lake Shore, the old Utah Central bathing resort, for the purpose of making salt. The experiment has only been recently tried, but so far it has proven to be a most unqualified success, and the proprietors are jubilant over the result attained. The method employed is the vat principle. The water is pumped from the lake into a vat raised a few inches higher than the one in which the salt is made. The two are connected by a pipe, the mouth of which is protected by a fine wire sieve, which prevents any foreign matter entering the lower vat. Underneath the lower vat, which is 12 feet by 5, and 14 inches deep, four large jets of natural gas are placed, and these give out an extreme heat that is simply remarkable. The gas wells were struck, it will be remembered, accidentally, or rather while the owners were driving for water, and they are now turned to better advantage than the water could have been. The method of making the salt is an extremely simple one. The water is run into the vat, the gas jet lighted, and when the brine attains a great heat, the salt being the heavier body, sinks to the bottom, and the magnesia, alkali, etc., float on the water. The salt is gradually drawn away from the impurities, and when the operation ends the result is clean, white salt, such as makes some of the brands now on the market assume an ebony tint by comparison. The salt is claimed to be much purer than any other similar lake product, and if snowy whiteness goes for aught, they certainly have good grounds for their assertions. The using of natural gas onto down expenses materially, and it may be that the gas will form one of the great natural resources of the Territory.—*Salt Lake Herald*.

THE Gold Hill Mining and Milling Company, at Quartzburg, says the *Idaho World* of the 25th ult., made a cleanup of \$8000. This is the first run made by the new mill, and the cleanup equaled the expectations of the owners.

Work on the Mother Lode.

A Sketch of Amador County Mines.

A correspondent of the *Chronicle*, writing from Jackson, Amador county, says: Last fall we heard of a boom in mining to come in the spring, and from all indications it has come in a mild form, and prospects are being developed on every hand. Several large transfers have been made in Plymouth, Sutter and Jackson. Messrs. Treglons, Minear and others, who have been in the East of late, find this place little known, except by those interested in the Plymouth Con., Bunker Hill, South Spring Hill, Medium and a few others largely owned East, only a few being listed there. Plymouth, which is always lively with the number of men employed by Hayward & Co. on their syndicate of mines, will soon have an additional 40 stamps in operation. The New London is pushing work with all speed, together with others who have started work in earnest, so as to not only make this the second but the first producing county in gold on the coast, being able to work low-grade ore at a large profit. Following southerly, along the mother lode, the first working mine encountered is the Old Potosi, with its ten-stamp mill going to its full capacity. Next is the Black Hills, belonging to Palmer Rule and others, with a large body of ore and ten stamps. It is understood that English capital will purchase this claim and add 30 stamps, and also purchase adjoining property.

Then comes the Gover Mill and Mining Company, who run their 20 stamps regularly. This must be a fine-paying property, from the rich ore found in the north shaft of the 400-foot level, though the mine has been prospected 900 feet. The Randolph, at Drytown, with its three stamps, is working on good ore, and Mr. Randolph is sure of a bonanza.

The Quartz Mountain—a blanket, or flat ledge—is running a 10 stamp mill with success, the rock going \$5 and the sulphurets said to be \$1740 to the ton. Any miner who inspects the claim cannot think otherwise than that the ledge will "right up" somewhere in the hill, and he one of the largest mines in the State, on account of the cheapness with which it can be worked. Other claims adjacent have lately changed hands, the Goodwin being one that work is progressing on. A short distance farther is Culbert's 10 stamps, working on his individual property with success. Again returning to the main line of mines, though all are on the same general mother vein and same character of ore, we come to the Bunker Hill with its extensive plant, 40-stamp mill, chlorination works and hoisting machinery, owned mostly in the East, and one of the standard mines in Amador City. Next is the Amador, owned by Hewitt & Culbert, who are putting up a mill. The ore in sight gives every indication of success. This mine was sold to and prospected by an English company before the era of working low-grade ore. Mr. Hewitt is the superintendent of the famous Keystone mine, owned by the Messrs. McDonald, of San Francisco. This mine has a history for its regular and prolonged dividends. It has a 40 stamp mill.

The South Spring Hill, J. K. Treglone, superintendent, has now 30 stamps, and from all accounts is to-day one of the richest mines in the State, and will be able for many years to add to the store of gold. It is owned partly in Boston, and will have additions to its mill again this spring.

Sutter creek, one of the prettiest of mountain towns, looms in sight with her old Eureka of fame. The Lincoln, Stewart and Mahoney mines are well known in the State, and combine 90 stamps, making new life in the town. The Wildman, that was lately sold to Eastern people, is having hoisting works put up and will take rank as a producer this season. Soon after leaving Sutter the Kennedy mine is reached, so long idle, but now worked by San Francisco capital, and from the regularity of payday and the steadiness with which the mill runs it is thought to be a paying investment. It is now under the charge of Superintendent Parks, late foreman of the Keystone. The Zeile mine, chlorination works and mill go on with the old-time regularity, working 125 men. Its past record has been nearly unexcelled and it has bright prospects for at least a decade.

Between the Kennedy and the Gwin mine the first of the prospects to attract attention is the St. Elton, owned by Messrs. Simmons and Davey, who are on the direct line between the two mines mentioned. They have run in a tunnel 150 feet, cutting a three-foot ledge with well-defined walls, slate gouge and exactly the same character as the above mentioned. After drifting on the footwall 50 feet the rock has improved with such rapidity as to warrant the owners putting up a mill, as the ore will pay \$8.23 gold and two per cent sulphurets of a high grade. In many of the prospect shafts on the claim the ore is much higher, carrying free gold in abundances. They will send their sulphurets to Messrs. Barney & Vorheese, of Sutter, who are the standby for the mines, having chlorination works in Sutter and Drytown. The St. Elton has attracted many mining men and capitalists of late, who speak very highly of it, and 1887 will undoubtedly see it among the hullion ships.

The Valparaiso adjoins the Mammoth tunnel claim and is very high grade, being coated with gold and found in few places as rich in this whole mineral belt. Next comes the Middle

Bar claim, on the Mokelmnas river, where they are sinking a double compartment shaft on a very promising ledge, and the superintendent is confident it will mill \$15.

This is one of the cheapest places in the world to mine, on account of the abundance of wood, water and low wages, this help being largely Italians and Austrians, except in Plymouth. Amador also takes high rank as a fruit country.

Southern California Sketches.

Our engravings give little glimpses of some points of interest in Southern California. In a country where there is such a profusion of charming scenes, acceptable either for beauty or historic interest or as exponents of recent progress and development, it is hard to make selection. A choice must be made, however, and the artist has consulted his own inclination. In the upper left-hand corner is one of our grand native oaks, which will convince the stranger that though California has great open plain-like valleys, and is frequently described as a treeless country, we have really great resources in arboreal beauty, in addition to the sequoias which we are generally credited with. Our California oaks are indeed grand trees and they are well scattered over the State. The engraving gives a good idea of the symmetry of the tree, although many specimens would be even more beautiful than the one here sketched, because of greater height in proportion to the breadth. At the upper right-hand corner is shown a roadway lying through a grove of these oaks—a scene such as can be enjoyed in many parts of the State—the special location in this case being near Pasadena.

In the center the artist gratifies his historic inclinations, and gives us a picture of the famous San Gabriel Mission church, an old structure which is being closely pressed upon by the march of improvements—the locomotive screaming by it on one side, the dusty highway on another—while the orchards and vineyards occupy the old lands of the padres.

In the lower picture is a newly established cottages home, with its vineyard on the lower ground, and beyond, over the trees, lie the wide valleys encompassed by foothills. This is no one of the mere, beautiful for outlook and desirable for rich warm soil and genial air—meads which are now being thickly covered with villas surrounded by orchards and vineyards.

In the brace of little pictures below are given two glimpses of Riverside, whose fame is golden. One sketch gives a bird's-eye view of Riverside, but shows only a small fraction of the territory which by enterprises, and money, and water, has been transformed in less than a score of years from a hunting-ground for coyotes into a garden spot, whose wealth reaches millions and whose reputation is world-wide. The other sketch shows a section of Magnolia avenue, with its handsome border of trees and palms—a drive which for length and beauty is unparalleled.

A NEW COAL DISCOVERY.—John Kilcourse brought to the *Courier* office yesterday a specimen of coal found on the ranch of Peter Malone, on the east side of Sonoma mountain. A chunk weighing about 35 pounds was hurled by Mr. Percival, of the Golden Eagle mine, who pronounced it as good as Seattle coal cropping. It burned readily. The specimens brought to this city were taken out six feet below the surface, where there is a regular vein from 12 to 14 feet wide. Of course the specimens taken so near the surface are nothing but croppings, but it is believed that by sinking a shaft a good quality of merchantable coal can be found. The vein is solid and six feet underground looks very promising. We have no doubt but that there are millions of dollars worth of good coal providentially stored away within the bowels of Sonoma mountain. —*Petaluma Courier*.

THE Lexington mines are located on and about Alamo mountain in Ventura county. The Frazier mine are but a few miles distant, but in Los Angeles county. A spur of the Alamo mountain runs north into the latter county, in which the Cedar Mining District is located. There are three quartz mills in constant operation in the latter district, and the claims are said to be rich and producing a profitable yield. —*Ventura Free Press*.

QUICKSILVER SHIPMENTS.—During the month of March the following quicksilver shipments were made to San Francisco from Calistoga by the here mentioned mine: Napa Consolidated, 220 flasks; Sulphur Bank, 111 flasks; Great Western, 105 flasks; total number shipped, 436. Large shipments of quicksilver were also made from the Etna and Oak Hill mines near Pope Valley. The Bradford mine has not been shipping much on account of repairs now going on there.

IDLENESS A PUNISHMENT.—Seven hundred convicts at Sing Sing are feeling very badly because there is nothing for them to do. They used to be employed in making stoves, but the contract has expired, and now they will be confined to their cells. This they consider far worse than working.

The Upper Yukon River.

Something of Alaska's Mineral Resources.

The following extracts are taken from a letter of Dr. Willis E. Everett, being extracts from his report to the War Department, taken while on his reconnaissance of the entire Yukon river in the summer of 1884:

The few years of mining experience which I have had in the camps of the Black Hills, Montana and Mexico have enabled me to come to a fair sort of conclusion as to what the upper Yukon river is really worth as a mineral country, and the following information is taken from a careful personal observation of the Yukon country:

Not one "mother vein" or "home lead" has yet been discovered on the Yukon river.

less on account of the small lead and great distances from the coast, Fort Reliance being nearly 1700 miles inland from the Behring sea-coast, or nearly 4000 miles from San Francisco. Thus, it certainly seems as if the Yukon interior of Alaska will never be a quartz-mining country.

But of placers—ah! the very strange anomaly exists of gold being found on nearly every pre-glacial bench or bar, and no real gold quartz yet found in the country!

I will assure, from actual experience, any miner who undertakes the first rudiments of rock and ground sluicing, that he can make fair wages on nearly any pre-glacial bar on the Yukon river above Fort Selkirk, though there is gold still below on the main river. The water is too deep and the yearly detritus increases too fast to allow very much success in bar-washing. The chief obstacle to placer mining, however, is the great difficulty in procuring

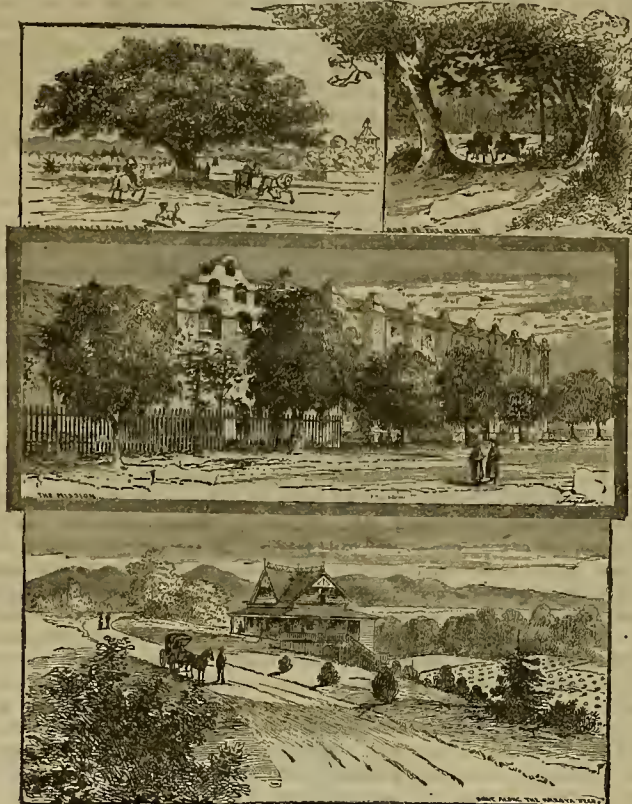
kan or Yukon interior. This part of the river freezes about the middle of September and thaws and opens about the middle of May.

Hotelinko river is the first actual tributary to the Yukon river. This river enters the Yukon about a mile below the mouth of the canyon and on the right or northeast bank. Sixty miles below is the second tributary, but there are several minor streams or creeks that intervene. The mosquitoes are actually abominable! Running along the current and by many islands and boulder bars, we arrive at the Bald peak. Far to the west is Lookout bluff. According to the Indian reports it is equidistant from the head of the east fork (the main branch) of White river and the Yukon. A wide chain of very rough and broken-up hilly country, heavily timbered, separates it from the Yukon river. The scenery now is many long, crooked heads, islands, snags and drift rafts, banded in by high sand bluffs. Running by a series of sand bluffs and scrub timber, we arrive at the Boswell gold bar. Here is the only mining camp on the entire 2500 miles of the Yukon river! I have named the great pre-glacial bar after the discoverer (Boswell, of Juneau, Alaska), whom I found working on the bar, with a series of rockers and the assistance of two white companions, Franklin and Madison, both of Juneau. He was waiting for the high water to go down so that they could get at the fine pay dirt on the edge of the lower rim rock of the bar. The silt would then be run through the rockers and the resulting black sand and gold dust would be washed out in gold pans over a mass of quicksilver, the latter absorbing the dust and allowing the black sand to be washed out. Boswell showed me some very fine flour dust, which he had in a sacking-powder can, about two ounces, and in six weeks from that time the party had taken out over \$2000 worth of dust. Of course, it was an exceedingly rich pay streak, which they might never find again on the Yukon, and they exhausted the strip of silt to deep water, which rendered the bar of no more value. The Boswell bar is situated on the east bank of the Upper Yukon river, about 75 miles above the Old Fort Selkirk and 560 miles from Chitca. The nearest fur-traders are at Fort Reliance, nearly 300 miles further down the river. The bar is surrounded by a dense growth of larch, birch and poplar. Considerable game, such as bear, moose and caribou and many valuable fur-bearing animals, black and silver foxes, lynx, etc., abound all through these upper valleys. The bar consists of small howlers and a fine gravel wash, in the concavity of a narrow horseshoe bend of about a mile in length. Its shape is like the segment of a circle, whose radius is about 200 yards. It is out of the direct current of the river and slightly above the mean level.

Only by carrying the pay dirt from a working streak to a series of rockers, can placer mining ever be made a success on the Tanana river, and even then, for nine months out of the year, the miner would have to relinquish his rocker and turn fur trader; and as the United States treasury laws do not allow any white man to trap or kill, for sale, any of the fur-bearing animals in Alaska, and as there are just enough fur traders on the river that the Indians require for the fur trade, it would not be a very paying investment for any band of able-bodied men to leave fair daily wages and come up to prospect these frozen regions. Certainly, they might make \$10 or \$20 per day to the man during this working season, and then again, they might not make 10 cents. But in the meantime, during the working season, first, they would have to be without half of the common necessities of life; second, constantly in danger from the Tanana Indians, who would be sure to be very jealous of them, and in all likelihood cause them much trouble; third, they could only work for three months out of the twelve, and the remaining nine months be compelled to do something else for a living; fourth, and something else in this bleak interior for a miner would mean nothing else; fifth, the profit thus made during the short working season would be more than swallowed up during the long non-working season; sixth, and lastly, the very great difficulty in getting self, tools and provisions into the country, and their extreme high cost, makes this Alaskan interior a very unfortunate mining country.

The Tanana river is distant from the head of canoe navigation on the Yukon river about 1400 miles, and about 1550 miles from Chitca, Alaska; and from the mouth of the Apuk channel, or northeast of the Yukon delta at the Behring sea, nearly 1000 miles. True for a little over 1000 miles, or to the lower rapids, the Yukon river can safely be navigated by any sized vessel that can enter the delta. Above this point it is not safe for a steamer to ascend this river any higher, although it is often done.

DISASTER AT TUSCARORA.—Tiding of a disastrous explosion at the Nevada Queen Mining Company's works, Tuscarora, Elko county, Nev., have been received. Superintendent F. F. Coffin telegraphed that a can of powder, used for blasting, ignited and caused a terrible explosion in the works. This was followed by the bursting of the boiler in the hoisting works, the latter explosion completely demolishing the building. The hoisting works were wrecked. Not a stick of timber was left standing. Five men were injured, and it is feared that their injuries will prove fatal, as several were badly scalded. Foreman Russell was among the unfortunates, and he is not expected to live.



SCENES IN LOS ANGELES COUNTY.



A GLIMPSE OF RIVERSIDE AND MAGNOLIA AVENUE.

There have been many surface veins and infiltrated seams of quartz, together with chimneys and blowouts of mixed hematite, galena, iron and copper pyrites and magnetic pyrites; some carrying free gold and native (malleable) copper have been found by the Indians and fur-traders on the Yukon, the head of White river and off toward the heads of the Copper and Tanana rivers. Small pieces of these ores find their way to the sea-coast, adjacent to these rivers, and excite a belief in the minds of the miners that the interior of Alaska is filled with seams and leads of rich quartz, when in fact there are only, after several years of careful exploration, three known seams of quartz on the entire Yukon river—the first at the Lava Cliffs, near old Fort Selkirk; the second at a small point, eight miles above Fort Reliance, and the third about 20 miles up the Novikaket river. All three are only chimneys or blowouts. Not a well-defined foot or hanging-wall has been found in any of them. The one at or near Fort Reliance has been slightly worked by the fur-traders at that post. Some of the ore, which is hematite, galena and copper pyrites, has been taken to San Francisco, and a careful assay made of it, and although paying ore if in a large enough body and near a mill, was value-

provisions and entering the country. This, coupled with the exceeding short interval between the leaving and the appearing of the ice in the river, makes it very difficult for any placer work. Hardly has a miner prospected a bar or gulch and got thoroughly to work, when the short season is at an end, and his water supply frozen up, and the intense cold during the winter months (70° below a Fahrenheit zero, and by a U. S. signal service thermometer at that), and the dread of that Arctic scourge, scurvy, with a possible short supply of provisions, compel the poor argonaut to either return back up the river and through the lake system cross the mountains to Sitka and Juneau via Chitca, or else descend the river to the first trading-post and drag out the long monotonous winter of fully eight months in absolute idleness, in company with the fur-traders. If a steady supply of provisions could be depended on at these fur-trading posts, it would be very different, but as they only have enough civilized food—beans, flour, bacon, etc.—for themselves, the miners must either bring in enough provisions of their own or else return to Chitca in disgust. This is, without any exaggeration, the cold drawn facts in regard to the mining resource of the valley of the Alas-



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SAN FRANCISCO:

Saturday Morning, April 16, 1887.

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Business Announcements.

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Dividend Notice—Paradise Valley M. Co.

See Advertising Columns.

Passing Events.

The election which took place on Tuesday resulted in the defeat of the proposed amendments to the Constitution of the State as far as related to the Judge of the Supreme Court and their salaries. The new charter for San Francisco was also defeated. At present writing it appears, however, that Amendment No. 3, relating to the charters of cities, was carried. This gives towns of certain size the privilege of framing their own charters.

From all parts of California come notes of enterprise and progress. Values are appreciating everywhere and the State is really entering into an era of progressive prosperity.

It is evident that there will be a boom in quartz mining in California this year. Prospectors are at work in the hills in all directions, and the mines that are already opened are being developed with vigor. The use of water-power in mining operations is making a great difference in the profits of many enterprises.

A good many miners are going to Alaska, attracted by the reports of new placers on the Yukon and Stewart rivers. A couple of hundred men went up on the last steamer. The mining season in that Territory is short.

JOHN SUTHERLAND, the popular and highly-esteemed superintendent of Wm. T. Coleman & Bro.'s Niagara mines and mill in French Gulch mining district, Shasta Co., died last week.

A QUARTZ LEDGE was discovered on the 7th inst. near Grass Valley by men who were digging post-holes.

Debasing the Bullion.

The method of calculating the bullion product of certain of our Pacific States and Territories that has of late years come into vogue, is one that seems to call for correction. Under this method all the copper and lead made in these countries is classified as bullion. Thus, the State of Colorado is reported to have turned out last year bullion to the value of \$25,000,000; creating the impression that her mines yielded that much gold and silver, whereas their yield of these metals did not exceed \$16,000,000 or \$17,000,000. So, also, the bullion product of Montana, Idaho, Utah and Arizona is set down at fully one-fifth more than it actually amounted to.

Now, this plan of calling copper and lead bullion is objectionable for two reasons: first, being a subversion of the truth, it tends to mislead the statistician as to the additions that are annually being made to the present stock of the precious metals; and secondly, it does an injustice to other countries, which, like California, Oregon and Dakota, produce only, or mainly, gold and silver. Under this system it goes out to the world that there was produced in the countries west of the Missouri river last year bullion to the value of \$100,000,000, whereas it amounted to only about \$80,000,000. This is clearly wrong. It is, in fact, propagating a falsehood. The raising of lead and copper to the dignity of the royal metals was effected, in the case of lead in 1870, and of copper, 10 years later. The value of their annual product at the time they were so ennobled amounted to only about \$1,000,000 each, their joint value being now nearly twenty millions. They should be relegated to their former status and there suffered to remain. They are not bullion; that consists of uncoined gold or silver, not pigs of lead or copper. As well call coal and iron bullion as these coarse metals, and concede to Pennsylvania the honor of being the greatest bullion-producing country in the world.

Through this gross perversion of terms California has been deprived of her well-earned and still merited supremacy as a bullion-producer, her annual output of gold and silver exceeding that of Colorado, to which this distinction has lately been so unjustly awarded, by several million dollars. She turns out some copper—a thousand tons or so annually; also, considerable quantities of petroleum, salt, quicksilver, borax and lead. But she has never accounted these precious metals, nor has she used them to magnify her apparent product of bullion.

ALASKA MINES.—B. W. Cowles, a mining man of Alaska, arrived here on the last steamer. He has the following to say of the mines of the Territory: "Senator Jones' Treadwell mine on Douglas island is working about 160 men. It is understood that they have lots of good ore. Some miners on the island, I don't know who they were, three weeks ago sold to a London company a property for \$1,000,000. A 200-stamp mill is to be put up there. A 160-stamp mill is in course of erection on the island on the Nowles property, owned by a Boston company. It is safe to say that within the next 12 months there will be more than 600 stamps at work on Douglas island. I suppose there is nothing like the ledges there in all geology. They are from 400 to 500 feet wide, and are low grade, mining from \$6 to \$14 per ton. There is a good deal of excitement now on the Yukon now, and at Berner's bay, 40 miles above Sitka, rich placer and quartz properties are reported found. A good many prospectors have gone in. The steamer Ancon, that left Port Townsend last Wednesday, carried up about 200 miners, principally from Montana and Washington Territory."

It is claimed that the Milton Mining and Water Company and the Gowell Mining Company have violated the injunction of the United States Circuit Court restraining them from carrying on hydraulic mining, and are guilty of contempt. S. C. Houghton, Master in Chancery of the United States Circuit Court, left Wednesday for Nevada county to investigate the matter.

A 40 TON FURNACE is being built at Spruce-mont, Nev. It is proposed to put the furnace at work on ores from the mines of that camp as soon as possible, and the future of Spruce-mont is considered quite favorable.

Reducing Ores of Nickel and Cobalt.

Commercial nickel, even when tolerably free from impurities, cannot be well welded, hammered and drawn, because the metal, when in a molten condition, absorbs oxygen and retains the protoxide thereby formed. A German inventor, Fritz Lotter, of Altena, Westphalia, has devised a means to avoid this evil and produce the metal in such form that it can be worked.

He so manages the reduction of the ores of the metal that a certain percentage of metallic manganese may be formed and left with the reduced nickel, so as to absorb the oxygen when the alloy is worked, and prevent the formation of the objectionable protoxide of nickel.

The oxides of nickel and cobalt, free from injurious impurities, are reduced to powder by the ordinary means, and mixed intimately with powdered oxide of manganese, in proportions to be determined for each case, after which the compound is formed into cubes or cakes in the same manner as is usually practiced with the oxides of nickel and cobalt.

The ordinary proportions are one part of oxide of nickel with from 2½ to 3 per cent of oxide of manganese. The compound is then formed into cubes or cakes which are placed alternately with layers of charcoal powder into refractory crucibles, the whole being finally well covered with charcoal powder and exposed about four hours to a temperature of the point of fusion of metallic nickel which ranges from 2500 to 3000 Daniel's pyrometer. Care must be taken that the temperature does not reach above the degree named, so that the metal may not be fused.

After the crucibles are cooled and the metallic cubes are separated from the charcoal and scorched or cleaned, said cube nickel contains yet about 1½ per cent of metallic manganese mixed with it. In melting this cube nickel containing manganese, either alone or combined with other metals, the manganese will absorb the oxygen which would otherwise combine with the melting nickel or cobalt, and thereby a nickel or cobalt free of oxide or a composition free of protoxide of nickel or cobalt can be obtained. Therefore the melting process must be managed in such a manner as to remove most of the manganese, but to let remain some small traces of it in the melting nickel, in order to prevent the latter from absorbing the oxygen.

In such melting process a small portion of glase or borax will serve to take up and bind the oxides of manganese that form and separate themselves, and they may be removed in the form of slag. The remaining metal then is to be molded in convenient castings. The melted castings or cubes of nickel and cobalt thus produced always contain small traces of manganese—say one-quarter to three-quarters per cent. This small percentage of manganese which is left in the nickel cubes serves until the melting process is finished, to prevent the absorption of oxygen, and is not at all detrimental to the final working of the metal. These melted nickel cubes are exceedingly pure, dense and ductile, possessing a very bright luster, and may be welded, rolled, hammered or otherwise worked. They may be alloyed with other metals—say with copper and zinc, for producing German silver—and will confer their qualities upon such compositions and improve their luster and ductility.

As above mentioned, the reduced cube nickel not yet melted—containing about one and a half per cent of metallic manganese—as obtained by the first operation of the process, is adapted to be used in metal composition, instead of nickel or cobalt, which is wholly free from oxides, for the reason that the manganese present at the melting will absorb oxygen, which would combine with the nickel. When it is absorbed by the manganese it can readily be separated from the composition in the form of slag. As these compositions rarely contain more than 30 per cent of nickel, they consequently will contain barely one-fourth or one-half per cent of manganese—an amount that will not at all interfere with the working of the composition metal.

DR. J. W. HOFFMANN, of the American Bureau of Ethnology, has been named by the King of Portugal a Chevalier of the Order of St. James, one of the most ancient Orders of Christendom. Dr. Hoffmann is well known on this coast, where he resided many years.

Who Oppose the Free Coinage of Silver.

There was turned out last year in the principal bullion-producing countries of the United States \$31,000,000 gold and \$54,000,000 silver. By reason of the fiscal policy adopted by our Government, silver has been practically demoted in this country. That in pursuing this course the Government has grossly blundered, is becoming every day more and more apparent. What renders this blunder the less excusable is the fact that these public authorities appear to have been led astray by the creditor classes and the money-changers, if they have not been guilty of playing directly and purposely into their hands. It is not simply a mistake, but it seems almost criminal that silver, from the earliest historic times accounted a royal metal, and to-day the favorite coin of more than two-thirds of the human race, should have been robbed of its money function and in this wanton and summary manner debased to a mere commercial commodity; and this, not because the public good required that this metal should be so ostracized, but because its demotion tended to promote the interests of the lenders and the insurers, acting in concert here and elsewhere, this policy having been largely dictated abroad.

We have not now, nor have we ever had, a plethora of silver in the United States. It has always circulated freely, having been the preferred money of the masses. California is not largely a silver-producing country. Our bullion consists mainly of gold, wherefore this discrediting of the cheaper metal does not hurt us materially. But we try to be American enough to take in the good of the whole country, regardless of local prejudices or class interests, especially where these interests are foreign. This is quite a large country, and, as it turns out more than half the bullion produced in the whole world, we might perhaps venture to adopt, in this matter of remonetizing silver, a policy more distinctively American, even at the hazard of giving offense to the bankers and brokers of London, Paris and Berlin. We would indeed be loath to incur the displeasure of these courteous people, but when it comes to weighing out silver instead of coining it, we object. These money-changers and the whole world are at liberty to buy and sell lead, copper and antimony by the pound, quicksilver by the flask, or, as our English consuls have it, by the "bottle," coal by the ton, potatoes by the bushel and wood by the cord; but when it comes to handling our silver we prefer that it should be coined into dollars and pieces of smaller denomination, each bearing the image and superscription of these United States. This is an honest money and ought to pass current at its face everywhere. And it would, did not our own Government dishonor it in their efforts to favor "gold bugs" at home and monometalists abroad. It is time that we have in our fiscal matters another "Declaration of Independence."

Mining Accidents.

At Bullion, Idaho, on Saturday, Thomas Walker and Archie Watson were killed in the Idahoian mine by a blast. They were extracting an unexploded charge in an old drill-hole. Walker was killed outright and Watson lived five hours.

A Chinese miner at Alpha, Nevada county, put a giant powder cartridge into a stove to thaw it out. An explosion occurred and the Chinaman and his cabin are missing.

Gus Trees, a miner, was instantly killed on the 9th inst. while at work in the Graphic mine, Magdalena district, N. M., by a premature explosion of giant powder. He was horribly mangled.

John Daniels, who had his skull fractured at the Pittsburg mine, Nevada county, recently, is getting along well.

Wm. Clemp was badly bruised by a rock falling on him in the Providence mine, Nevada county, but no serious results are anticipated.

ENGLISH COKE is scarce here at present. It is now worth about \$20 per ton. The present monthly consumption is about 2200 tons. We imported 26,293 tons last year. A great deal of this coke is shipped by rail to the various smelting works on the coast, and considerable is used by local foundries.

SAN BENITO OIL FIELDS are claimed to be the best yet discovered on the Pacific Coast.

The March of Improvement.

There is scarcely a city or town in California which is not now showing a desire to keep pace with the march of improvement and progress. On all sides steps are being taken to develop the natural resources and to build up manufactures. Railroads are being built in all directions and others are being planned. The principal towns are planning or building cable or electric street railroads and otherwise improving their surroundings. New hotels are being built and new towns are being laid out. For a time this marked enterprise was mainly confined to Southern California, but it has now spread all over the State. Many new settlers are coming in and lands are advancing greatly in value. We append a few items of interest which show how general are the steps being taken to improve affairs in California.

The Board of Public Works of Los Angeles have recommended to the Council, and the Council have granted, franchises for two new cable railroads in that city. One of these was granted to the Los Angeles Development Co. and the other to J. G. Crank and Herman Silver. All the horse-car lines in the city are to be transformed into cable roads.

The citizens of Visalia and Tulare are about to join the two places together by a street-car railroad. The cars are to be run by a dummy engine. Application has already been made to the Board of Supervisors to grant a franchise for the roadway.

The Kern County *Californian* states that owing to the difficulty of procuring white labor, the railroad contractors in Southern California have raised the wages paid by them to \$2 a day. Board costs \$4.20 a week. Apropos of this, nearly every town in Southern California complains of the swarm of tramps and vagrants.

The State Board of Harbor Commissioners have decided to build another 1000-foot section of the San Francisco seawall. The cost is placed at \$134,970. The contractors agree to have the entire wall and wharf built in 12 months and not to employ Chinese labor, under a penalty of forfeiture of the contract.

Arthur Brown, of the railroad company, is busily at work on plans for the new Del Monte hotel, at Monterey. Work will be proceeded with at once.

The Colton *Semi-Tropic* says: Every idle man in the country can get employment on the great railroad and ditch works now going on in Southern California, and there is now no good excuse for an army of tramps and beggars.

At a meeting of the Italian Chamber of Commerce, held at 506 Battery street, San Francisco, communications were received from Italy, asking that samples of Californian canned fruit and canned salmon, and also matchboxes, be forwarded to Italy for exhibition in the Commercial Museum of Milan and Turin. The split-wood match is as yet unknown in Italy.

Major W. H. Loler is organizing a company to build a tube from Los Angeles to Pasadena, through which passengers and packages will be forced by pneumatic power.

At San Jose, an electric railway company has been granted a franchise by the Council to operate a double-track road on Santa Clara street, to be commenced in 60 days and finished in six months.

The Colton motor road is to be extended to Arrow Head Springs as soon as the rails can be procured.

The San Francisco Board of Supervisors have passed to print a resolution granting permission to the Telpherage Electric Railway Company to place and maintain, until Aug. 1, 1887, a steam plant of ten-horse power on premises at the northwest corner of Foley and Twenty-fifth streets, for the purpose of generating electricity to be used as a motive power on the cars of the North Beach & Mission railroad.

A new plant for the Gas and Electric-Light Company of San Diego has arrived in that city. It is six times the capacity of the plant now in use.

Eight electric-light poles will be erected by the gas company, which recently purchased the plant of the Thompson & Houston Company at Santa Rosa. Most of the lights will be on Fourth street, and those around the plaza will be 60 feet high.

In connection with the Southern Pacific Railroad Company's purchase of 55,000 tons of steel rails, a great many thousand tons are to be used in extending the Mexican International

road from Monclav, Mexico, to Lerdo on the main line of the Mexican Central. When this is completed the Southern Pacific will have the shortest line between the City of Mexico and New York. Connection is also to be made with the Mexican National by building from Monclav to Sotillo, Mexico.

The coast collieries are reaping a benefit from

about 30 miles. If it be extended to the coal fields, five miles south of Livermore, it would be of incalculable benefit and furnish an unlimited amount of cheap fuel for the proposed factories and domestic use.

The recent reduction in rates from this city to Western Colorado seems to have done much to increase freight shipments to that Territory.

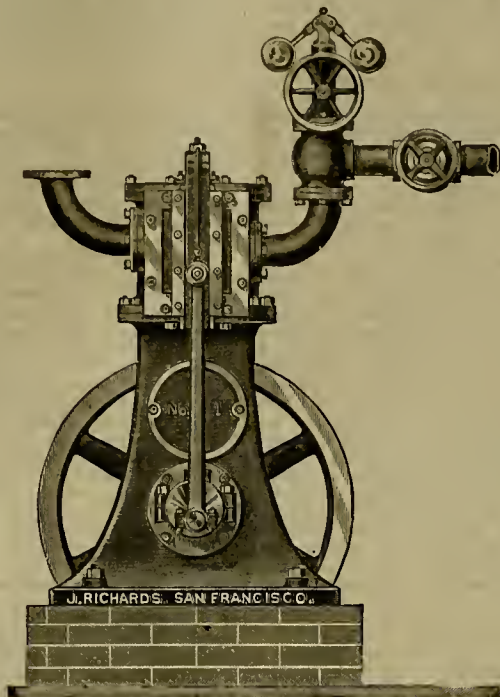


Fig. 5.—RICHARDS' PATENT COMPOUND NON-CONDENSING ENGINE.

the low price of tonnage just now. The idle vessels are glad to get coal freights in the coastwise business.

It is reported that the San Francisco & North Pacific Railroad Company (narrow gauge) has commenced to build an extension of its

Previous to the Interstate law, all freight for Colorado was sent to Denver, and was then distributed to the other portions of the State.

Now, however, in consequence of the operation of the long and short haul clause, the outlying portions of the State receive San Francisco

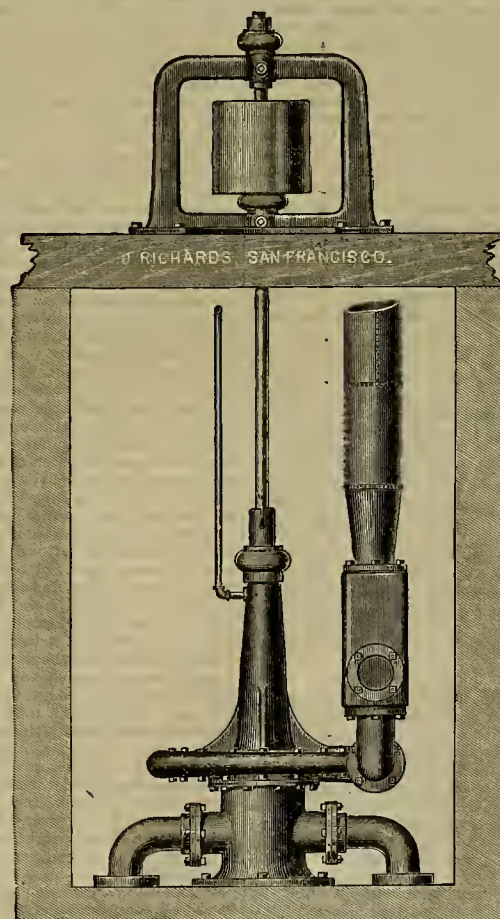


Fig. 6.—RICHARDS' PATENT PIT PUMP.

road from Markham's mill on the north side of Russian river to a large belt of redwood timber on Willow creek. There is in this body of timber over 40,000,000 feet.

The proposed survey of the Southern Pacific Company for the railroad from Martinez to Livermore through Green, San Ramon and Taffajara valleys, will traverse one of the most fertile sections of the State. The distance is

freight cheaper than Denver does. The reduction in rates to Nevada and Utah will, it is thought, do much to build up the trade between these points and San Francisco in commodities hitherto imported from Chicago and the East.

THE rumor that there has been trouble at the Anaconda mine, over the wages question, is denied. The smelter is running full blast.

Richards' Patent Hydraulic Machinery.

NUMBER 3.

In the accompanying engravings Fig. 5 shows a smaller engine, with cylinders equal to 6½ and 10 inches diameter, without condensing apparatus.

In these engines the valves are driven from an overhung crank, dispensing with the common eccentric. The valve-rod is removable at the top, by means of a single screw, so the valve-box cover can be removed without obstruction, the valve-slide seen on the outside coming away with the cover and causing no inconvenience. It may also be mentioned that the valves can be set and adjusted without opening the valve-box, a peculiarity of engines arranged in this manner.

The next machine we illustrate, in Fig. 6, is a pit centrifugal pump, to raise water to 100 feet high. These pumps are made on the same principle as those previously described, but with very different proportions. The casing is heavier, and the runners, or wheels, of large diameter. They are very simple in construction and can be readily put together or taken apart in place. The driving-shafts are independent from the top, and so arranged that their weight cannot in any case rest on the runners.

The different sections of shaft, when two or more are employed, are connected by removable clamp couplings, so constructed that the shafts cannot slip or draw out of the couplings and rest on the pump-pindles.

These pumps are the result of a wide experience in this class of pumping, and are a great improvement in simplicity and first cost over the compounding plan which has been tried and abandoned in both England and France. The present pump is in many respects similar to the "Farcot" system, on which pumps are made to work against a head of 30 meters (108 feet) and attain an economical duty. The air-vessel and valves are contained in one chamber, thoroughly accessible and arranged to protect the pump from water shock.

Foundry Notes.

The winding machinery for the new Powell-street cable railroad is being made at the Riedon Iron Works in this city. There are to be four engines, 22 inches in diameter and 48-inch stroke. They have the latest improved automatic Corliss valve gear, and are similar in construction to the engine built for Senator Fair's cable road in Oakland. The spur-wheels will be 14 feet in diameter and 23 inches face. The winding reels will be 13 feet 9 inches in diameter. This machinery will wind three separate cables, which will be run at a speed of eight miles an hour—faster than the other cable roads in the city. There are to be six horizontal tubular boilers, 54 inches in diameter and 16 feet long, made of steel. The plant will have Llewellyn steam-beaters and Hooker feed-pumps, and it is believed that when complete will be second to none in the city or elsewhere.

The new North Star quartz-mill, in Nevada county, just completed by these works, is believed to be the most complete and perfect gold mill on the coast. It may be well to state that the machinery for the mill was designed as well as built by the Riedon Iron Works, although the credit for the designing has been given to other parties by some of the newspapers.

The new pumping engine for the station of the Spring Valley Water Co., at Black Point, has been formally accepted from the Union Iron Works, the builders. The engine is 250-horse power, with low pressure cylinder 42-inch diameter, and high-pressure cylinder of 22-inch diameter, 44-inch stroke. The fly-wheel is 18 feet in diameter and weighs upward of two tons. A great saving of coal has been effected by the use of the new machinery, as proved by a few weeks' practical test.

There are two new boilers with the plant, one of which is a Babcock & Wilcox of 250-horse power. The other is a 200-horse power Hazleton, built by the Pacific Iron Works, Pacific Coast agents. We recently described and illustrated the boiler in the PRESS. It seems to be meeting with great favor here. It makes steam quickly and economically and occupies little floor space.

The new steamer for the South Pacific Coast Railroad Co. will be ready for launching in about a month. She is 235 feet long and will be used on the Oakland ferry line. The motive power was designed and built by the Fulton Iron Works. It is a beam engine with cylinder 50 inches in diameter and 10-foot stroke. These same works have also designed and built engines, etc., for the new steam schooners for the lumber trade on the coast. One of these is for the Fort Bragg Lumber Co., and the other for the West Coast Lumber Co.

MECHANICAL PROGRESS.

Hot Journals.

We clip the following notes on hot journals from data given by Joshua Rose:

If a hearing and journal have once run cool, they will always run so under the same conditions. Or if similar hearings have been made to run cool on other like, or rather duplicate machines, the trouble may be traced to the lubrication, the workmanship, or the adjustment.

When a journal heats there is some direct mechanical cause for it, which, in nearly all cases, lies so near the surface that it may easily be discovered.

In a new design of machine it may arise from improper designing, such as too little bearing and journal area, or the springing or bending of the shaft, improper or insufficient lubrication, faulty material, bad fitting of the hearing to the journal, improper adjustment of the hearing, or want of correct alignment.

Heating from faults of design is not that which troubles the engineer permanently, because it forces its own correction, and furthermore, the principles of correct journal and bearing design are so well understood nowadays that such errors are comparatively rare.

In the matter of lubrication it is pretty well acknowledged that, although the light and mineral oils may answer for many purposes, good lard or sperm oil will answer for almost every purpose of journal and bearing lubrication; hence, where the journals give any trouble, a resort to sperm or lard oil is generally one of the first expedients. The employment of plumbago, sulphur, etc., is simply an expedient that may be stated as being irregular, or, perhaps better, as unprofessional practice. Not that such expedients may not be of value in exceptional cases, but rather that those cases are regarded as having no business to be exceptional.

In the matter of the material it is now conceded that a cast-iron hearing will work well with a journal composed of any metal whatever, whether chilled, hardened or soft, provided that the pressure per square inch of its bearing be within certain limits. These limits Prof. Thurston and Mr. Coleman Sellers state respectively as being not over 50 or 75 pounds per square inch.

"Composition brass" will always make a hearing that will run cool under a maximum of load, provided the mixture of metal is such as to properly come within the limits of what the term "composition" is supposed to imply; but the extra profit gained to the molder by the employment of a good deal of zinc and of very little tin makes the ordinary "composition brass" a very doubtful metal. What is known as gun metal is a little more, though not entirely, reliable, the defect being in nearly all cases an insufficiency of tin.

Heating sometimes occurs from the bearings not bedding fully to the journal, but when this is the case the self-correcting tendency or wearing down to a bearing, as it is termed, proceeds rapidly. But it is not to be overlooked that "wearing down to a bearing" is another term for letting the parts that should have been fitted out themselves to a fit.

A hot journal is often produced by too close a fit or adjustment of the hearing to the journal, which does not afford sufficient room for the oil. The degree of fit that will not heat and yet have no play is that attained when the shaft will rotate as easily with the cap screwed home as it will with the cap loosened. In the case of heavy shafts, however, it is difficult to test the fit in this way, but it may be adjusted by placing red marking on the journal, screwing home the cap, and easing the fit until, with the cap screwed home and struck with a block of wood and a hammer, the marking on the journal does not transfer to the cap bearing area.

A very common cause of the heating of journals having brasses, and boxes composed of two halves, is that both halves alter their shape from cause attending their wear. Thus most engineers will have noticed that although there is no wear between the sides of a brass and the jaws of a box, yet in time the brass becomes a loose fit in the box. Now since the sides of the brass have, when fitted, no movement in the box, it is evident that this cannot have proceeded from wear between those surfaces, and it remains to find what causes this looseness.

Most engineers will also have observed that though the bottom or bedding surface of a brass end of the box may have been carefully filed to fit each other when new, yet, if in the course of time the brasses be taken out and examined, and more especially the bottom brass that receives the weight, the file-marks will have become effaced on all parts where the surfaces have bedded together well, the surface having a dull bronze and condensed appearance. This is caused by the vibrations under pressure having condensed the metal. Now this condensation of the metal moves or stretches it, and causes the sides of the brass to move away from the sides of the box, and consequently to close upon the journal, creating excessive friction that may and very often does cause heating.

It is for this reason that on such brasses the sides of the brass boxes are, by a majority of engineers, eased away at and near the joint, and it follows from this cause, the same easing away is a remedy.

This brings us to the advantage of babbitt

metal for bearings. In the first place it dispenses in many cases with the brass or separate bearing piece, and thus avoids the evils pointed out as attending the employment of brasses. In the second place it will conform readily to the shape of the journal, hence need not be so accurately fitted, and is not so liable to cause heating if improperly fitted or bedded.

HAMMERING CIRCULAR SAWS.—Is there an exact science in hammering buckled steel saw-plates straight, or is it managed by a well-focused judgment, heeded by phenomenal mechanical instinct and large wages? This question is answered by a cotemporary as follows: "Every science, properly so called, is an exact science. Hammering buckled steel saw-plates straight is particularly an exact science, as any inexperienced person will find who may have the curiosity to try a 60-inch saw that is buckled badly, and undertake to make it 'as straight as a die.' We have met a large number of men who have first-class skill in hammering saw-plates to the required condition to produce the best results. There is nothing phenomenal in their appearance or actions. They belong to the genus homo, and if not possessed of too much self-esteem will tell you that the principles of their art are very simple. Practice soon teaches them the 'tight' places, which they hammer, thus stretching the metal and producing an equilibrium of tension throughout the plate. Special anvils and hammers are necessary for large plates, and the practice and judgment required to do first-class work is not greater than is necessary in hundreds of other industries. Circular saw-plates are first straightened, and are then hammered to give the rim a tension to resist 'centrifugal force' and the strain and heat developed when cutting in the log at high speed. Saw-makers frequently fail in making this rim tension the exact degree required for all purposes, and on this account they do not always 'stand up' in sawing very hard wood."

HOLLOW VS. SOLID SHAFTING.—Although a shaft made in the shape of a tube is stronger than it would be if made of a solid bar of the same dimensions, it does not follow that a solid shaft is increased in strength or better prepared to stand a sudden twist if a portion of the material is bored out along its central line. Frequently workmen entertain the idea that the core of an axle or the bearing of a shaft is a hindrance in the way of strength, and is one of the reasons for making them hollow; this is not so, as it is merely the arrangement of the material that improves its strength. Boring out a solid shaft lessens both its weight and its strength, but the material is removed from the portion where the least resistance is offered; therefore the loss of weight is greater than the loss of strength. The particles on the outer surface are tested to their utmost when those in the center barely receive any action at all, and from this line to the circumference they are gradually being brought into use until those on the outside are ready to break apart when the limit of strength is reached. In tests that have been made, results have shown that the weight may be reduced 16 per cent by boring, while the strength would not be lessened by more than $\frac{1}{2}$ or 2 per cent. The success of many designs lies in so arranging the material that where any fracture is likely to occur, as much metal may be used as is likely to be wanted to stand the increased strain.

A TON OF COAL.—Chemistry has revealed much that enables us to agree that there is more in a ton of coal than is obvious. Besides gas, a ton of gas coal will yield 1500 pounds of coke, 20 gallons of ammonia water, and 140 pounds of coal tar. Destructive distillation of the coal tar gives 69.6 pounds of pitch, 17 pounds of creosote, 14 pounds of heavy oils, 9.5 pounds of naphtha yellow, 6.3 pounds of naphthalene, 4.75 pounds of naphthol, 2.25 pounds of alizarin, 2.4 pounds of solvent naphtha, 1.5 pounds of phenol, 1.2 pounds of aniline, 1.1 pounds of aniline, 0.77 pounds of toluene, 0.46 pounds of anthracene, and 0.9 pounds of toluene. From the last-named substance is obtained the new product known as saccharine, which is 230 times as sweet as the best cane sugar.

BUYING A BOILER which figures up largely in heating surface is one thing, and getting good evaporative results from this surface is quite another thing. It was supposed by many persons some years back (and is supposed yet by some) that the more tubes you could crowd into a steam boiler, the better "steamer" it would be; but time and experience have proved to manufacturers that free circulation of water in the boiler is much more important.

TRANSMITTING STEAM-POWER.—Within the limits of heating and shafting overhead, or shafting in any direction or all directions, underground power may be readily transmitted; but when the attempt is made to send steam for power or for heating, it is quite probable that it will be found economy to make the coal into gas and transmit that to points to be consumed under boilers and water-heaters to supply steam on the premises.

THE STEAM GAUGE.—Locate the steam gauge in a good light and keep its face clean, so that it will not require an electric light, a step-ladder and a telescope to tell where the needle points. Have it tested occasionally, that you may know if it is in proper working condition.

SCIENTIFIC PROGRESS.

The Progress of Science.

The Origin of Life—Vital Force.

Dr. J. B. D. Stillman, in his introductory remarks to "The Horse in Motion," published under the auspices of Hon. Leland Stanford, says some good things in regard to the origin of life and vital force which will well repay perusal, or re-perusal if they have been read before. We copy a portion of his introduction, as follows:

The progress that science has made in every department, and is still making, is wonderful; and who can say where it will end? But in the knowledge of the laws which govern the origin of life, the vital organs and their functions, of the nature of that force by which one form becomes altered or modified by the altered conditions of its life, it has made no progress since the days of Job.

The whole question of life and vital force is still a great mystery, although it is receiving at this time the concentrated attention of the most intelligent naturalists of all nations. There are not many who deny that organic forms may be modified within certain limits by artificial means. There are many who believe that all organic beings, of whatever nature, had their origin in the most rudimentary element, as a cell possessing certain inherent tendencies to develop by aggregation into other and higher forms, unequally modified in various ways by surrounding influences, with a tendency to variation by imperceptible degrees in every direction, the useful variations favoring the existence of the individuals possessing them. This idea has become familiar under the terms of "natural selection" and "survival of the fittest." This hypothesis does not presuppose design and denies a Creator. Under the name of "Darwinism" it has become popular and invaded all ranks. It found the soil of Germany especially fitted for the propagation of a theory of such an atheistic character, and it was proposed at a meeting of the Society of Naturalists at Munich, a few years ago, to teach it in the national schools. It has become so generally diffused in our own scientific circles that a reference to a Supreme Being in an essay read before a society of naturalists would be considered to be a poetic license, if one had the courage to make it, and nature is usually personified to meet the necessity. We have long been familiar with the reference to the laws of nature, and we now begin to bear of the laws of evolution. In all ages there has been a tendency on the part of the masses to follow some leader whom they desired to do their thinking for them; to pin their faith to his, or what they supposed to be his. It is no less so in the scientific circles than in the religious. Dogmatism seems to be leaving the latter to attach itself to the former; at all events, it is inherent in the human mind. No person is utterly free from it, and to appeal to the opinions of those whom we believe to be better informed rather than to examine the foundations of these opinions has been the vice of all ages.

It is well known that faculties and functions are strengthened by use, and weakened, or altogether lost, by disuse. We shall look in vain for proofs of an organ changed in the mechanical principle of its construction, or one evolved by imperceptible degrees where none existed before; but we shall, on the other hand, find proofs in anatomy that the changes could not have been gradual. Every stable-hoy knows that qualities are transmitted by heredity, and that desirable ones may be bred by judicious crossing within certain limits; and he knows as much as any one of the force or influence by means of which this is brought about. Speculation should not be confounded with science, as was said by Virchow, or science will lose its claim to the respect of mankind; and this whole question of evolution is speculative when carried beyond proof; and sciences, when it crosses the vital boundary line, is lost in speculation. We know that organic matter is subject to physical laws like other matter; it is attracted by the earth, and will fall with a force as great as if it were inanimate, and is equally subject to the law of falling bodies. It acquires momentum, and its momentum is equal to its weight multiplied by its velocity, the same as that of a railway car or a cannon shot, and when vitality leaves it, it is resolved to its original elements, oxygen, carbon, etc., which the chemist can prove by analysis. But has the most skillful chemist ever been able, by synthesis, to restore the lost element—the vital spark? Has he ever been able to imitate the products of that vital laboratory, the stomach, and form the aliment that replenishes the blood?

With all the knowledge of physics ever acquired by man, can he make a pump so perfect as the heart, that organ which forces the blood, loaded with fresh sustenance, to every part of the body? And what does he know of that power that has kept it in alternate action and rest every instant since before the earliest memories of his childhood?

He has been familiar with the laws of optics for centuries, and has made instruments of glass and metal in imperfect imitation of the eye of an animal to exalt the powers of his own vision; but what would not an optician give to be able to construct a concentric achromatic lens, with automatic power to adapt itself to the distance of objects, such as the eye of the lowest vertebrates?

Aesthetics is another of the physical sciences of which man is a professor, and he has just invented an instrument by means of which he can communicate, in ordinary vocal sounds, to a person miles distant. He has recently invented another by which he can register and preserve the intonations of his voice, to be returned to him at will at any future time; but that most wonderful instrument, the ear, he can only wonder and admire. Without it the world would be without music, voice or sound; the faculty of speech, our consciousness, memory, imagination, affection—but it is needless to multiply this class of facts. In nothing does man show himself to be the creation of an intelligent power more than in his own creative faculty. How great have been his achievements in mechanics! But what comparison does the highest bear to the locomotive apparatus or machinery of a horse, with its compound system of levers, pulleys, tendons, springs and muscular powers, and that marvelous ingenuity in arrangement to produce results which man has not been able to understand until now, and all set in motion through telegraphic communication distributed to every muscular fiber, and the whole of this complicated system of organs, co-ordinated and controlled by one central will?

Another incomprehensible mystery of life is that this complicated machine should possess the power not only to preserve and protect itself through a long life, but of reproducing from generation to generation indefinitely, and transmitting to posterity its own peculiarities of form and mental qualities!

Does the whole organic world furnish no proofs of intelligence and design, that we must be told that all these marvelous manifestations of both are but the inherent properties of matter,

"And that were true which nature never told?"

If it were an "attainment end an aim" to escape moral responsibility by getting rid of a creator, do we approach any nearer the solution of the question of the origin of life by removing it farther off into the mytho-geological eras? Or is the difficulty in any way diminished by attributing to matter all the high intellectual functions that have been, by un-schooled people in all ages, ascribed to supernatural powers?

Can the microscopist, when he discovers vibriones in a vegetable infusion, or protoplasm in a drop of serum, be excusable for running naked, like the philosopher of Syracuse, through the streets, shouting "Eureka!"? Can one who finds a shingle or a brick, claim that he has discovered the cause of a house? Let him account for the origin of the brick and the shingle!

Because the skeleton of a four-toed horse, which failed to connect his species with our time, has been found in the fossiliferous deposits of the interior of this continent, does it follow that our noble soliped had an origin less remote and independent, or that he found it necessary and practicable to concentrate his four toes into one, or succumb to the altered conditions of his life?

All science, in whatever department of knowledge, is retarded much by the ignorance and zeal of the multitude who follow on the heels of genius. Medicine has its mountebanks, who are dragging a noble science into contempt; religion has its harlequins and natural science its buffoons, who as itinerant lecturers perambulate the towns as representatives of learning they do not possess, and put forth as proved truth the wildest speculations of enthusiasts and call them science. It is very common to hear of the origin of man from the ape, as if the relation were a scientific truth, when, in fact, it is only a speculation; and all the evidence so far collected from fossil remains as early as the tertiary deposits, gives no confirmation to the speculation. As far away as any trace of the prehistoric man has been found he was as perfectly developed as he is to-day, and as far removed from the ape.

Darwin is not responsible for what is known as Darwinism. He is a model for a naturalist, collecting facts and placing them in their relation, drawing his conclusions cautiously, and candidly admitting the difficulty when a fact antagonizes the hypothesis he is framing. Not so with his zealous disciples, who rush to their desired conclusions over his facts as the fanatical Christians of Alexandria did over the last vestal altar of Greek philosophy.

Organic life is the result of either chance or design; there can be no middle ground. If the latter, the question of how it was brought about will never be solved by man, nor is it important that it should be. It is sufficient that a Supreme, Intelligent Will is the author and sustainer of all—a beneficent Spirit, who

"Grows in the sun, refreshes in the breeze,
Glows in the stars, and blossoms in the trees,
Lives through all life, extends through all extent,
Spreads undivided, operates unspent."

Who has endowed us with faculties to admire the beautiful, the good and the true, to know why so many things are as we see them, but none to know how.

THICKNESS OF HUMAN HAIR.—Measurements have shown the thickness of the human hair to vary from the two hundred and fiftieth to the six hundredth part of an inch. The silkworm's thread is one five-thousandth. Blonde hair is the finest and red the coarsest. Taking four heads of equal weight, a patient German physiologist found the red one to contain about 90,000 hairs, the black 103,000, the brown 109,000, and the blonde 140,000.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ADDING MACHINE.—Brainard F. Smith, Sacramento. No. 390,118. Dated March 29, 1887. This adding machine is a combination of devices, somewhat difficult to describe clearly without the aid of engravings. The inventor claims several improved features over those machines of ordinary construction.

CHROMATIC PRINTING APPARATUS.—Fairfax H. Wheelan and Albert Schurch, S. F. No. 360,185. Dated March 29, 1887. This invention relates to certain improvements in chromatic printing so that two or more colors may be printed at one impression. The apparatus consists in the construction and combination of devices.

FRUIT JAR.—Delmas E. Ashby, S. F. No. 360,131. Dated March 29, 1887. This is a fruit jar having an elastic packing fitted into a depression or channel around its top and a groove or channel around its outside below the top, a thin perforable metal cap resting upon the elastic packing, and a heavy sheet-metal rim fitting over the cap and having a flange turned down and indented or fitted into the exterior groove or channel of the jar.

Locomotives of To-day.

A machinist in the Southern Pacific shops at Sacramento was in this city recently. He stated to an *Examiner* representative that he had returned only recently from a trip East and a visit to the Baldwin Locomotive Works at Philadelphia.

"There is a growing demand," he said, "for heavier and stronger engines that will be able to draw heavier trains at a higher rate of speed. Those in general service are light and not fitted for the heavy work required of them. Railway managers as a stroke of economy are coming to the conclusion that heavy trains lessen expenses as against light trains and many of them."

"Freight will be carried more expeditiously in the future. The engines in use for freight service are constructed for strength and not for speed. Their drive-wheels are much too small for quick travel. Not many more of this order will be built except they are for mountain work."

"While the railway managers are anxious to meet the demand, they are unwilling to relay their road with heavier rails and to rebuild all their bridges, as this would entail the outlay of enormous capital. Of the ordinarily constructed locomotive, its two most vital parts are the valve-gear and the boiler. These are unable to meet the demands made on them, and experiments are being made in nearly every large shop in this country. The end looked to is a more speedy engine, which must necessarily be more weighty, and must be strengthened more at weak points. The locomotive now in use is the same one of 25 years ago. Speed and power, what the ingenious machinists are working for, can only be attained by lessening the machinery—making the construction of the engine more simple than it is at present. Mr. Strong, of New York, has, I hear, made several improvements, but I cannot say what they are at present."

"What is called the American locomotive, for design and beauty of model surpasses anything in the world. It is also much lighter than those used anywhere else."

"The English engine is more ungainly in appearance than the American, but when they are put on parallel tracks, they are neck and neck for speed, though the English has the advantage in point of strength."

"Building engines in America is more difficult than in England. Here allowances must be made for heavy grades; English companies have, by the expenditure of much capital, dispensed with grades. There are many points about the American engine that require perfecting before it can be recognized as the most complete locomotive in the world. Inventors in this line have received little encouragement from railway managers, and they have had little inclination to waste their time in unprofitable researches. Now the railways all over the country are looking for improvements, and the brains of the inventors are busy."

A CURIOUS STEAMER.—Matthew Turner has built a unique tugboat in this city for service in White's river. She is about 60 feet long and 15 feet beam. Her deck is of the kind most appropriately designated by the name "turtle back," being high amidships and sloping down toward stem and stern. The motor is a steam engine of great power, working two huge screws, one in the bow and the other in the stern. Everything about the little craft is exceedingly massive, and needs to be, as she is intended to withstand the terrible sea on the harbor.

The Board of Supervisors of San Jose have granted to S. A. Bishop, W. S. McMurry and Jacob Rich a franchise for building an electric motor or cable railway from San Jose to Santa Clara. The road is to be in operation within a year.

USEFUL INFORMATION.

Hardened Petroleum as a Fuel.

How it is Made and How Burned.

Efforts and experiments are constantly being made to utilize petroleum as a fuel. The Russians burn the waste after refining. Experiments in this country have generally been made with the natural product, just as it comes from the wells, in which condition it varies greatly in character and quality, and of course may require different conditions for being utilized as fuel.

But the most recent proposition is to reduce the natural oil to a solid substance and burn it after the manner of burning coal. This discovery comes to us from Russia. Dr. Ksuffman, in his report to the Russian Government upon the matter, describes the manner in which it is converted into a solid and burned, as follows:

"Petroleum, which is a hydrocarbon of the so-called methane group, may be saponified just like the oils, fats, fatty acids and wax, thus oxidizing the oil and combining it with soda or potassa salts. For this purpose the oil is heated and from one to three per cent of its weight in common soap is added, with which it is boiled for about half an hour. After that time it will be noticed that the soap is all dissolved in the oil, and the fluid will suddenly turn into a hardened, putty-like substance, which will get as hard as stiff tallow when cold. This may be pressed into any shape desired. The substance is very hard to light and burns quite slowly, without making any smoke, with a reddish flame producing great heat and leaving about two per cent odorless, black and hard residuum. Compared with coal, it burns about three times slower, producing, if the draught be well regulated, about seven times more heat than anthracite coal. It could well be used in a stove specially constructed for the purpose, or in the old stoves if they are changed, which will not be very difficult. It is, therefore, very probable that petroleum will take the place of coal in many instances in the near future, which fact stove manufacturers will have to take into consideration."

Should these results be realized, solidified petroleum as a fuel may lay claim to the following decided advantages:

1. It is universal, abundant and cheap.
2. It may be pressed into any form desirable.
3. It burns slowly, without smoke, and produces great heat.
4. The fluid petroleum can be piped to the point where it is desired to solidify it at a less cost than coal can be carried on cars.

When the great Pennsylvania Railroad Company becomes interested in the subject, it is natural to look for early and tangible results.

METHOD IN FIRING FOR STATIONARY ENGINES.—A correspondent of *Power* says: It may be of interest to your readers to have the methods which an old engineer employs in handling his fire. My method is to run as heavy a fire as my firebox will allow to be kept under the bridge wall, and not to disturb it more than once in a ten-hour run, then clean out with care and as speedily as possible, dress light and let it come up and get ready to bank. In banking, make sure to have an even fire, as deep as the bridge wall will allow. Then I shut my dampers and let it lie. In the morning I open and govern by the dampers. I do not touch my fire until 3:30 or 4 o'clock in the afternoon, and then proceed to clean as before. In order to do the work in this way it is necessary to have boiler enough to do the work easily and not have to drive the fire, and, another thing, it is necessary also to have the boiler set right to begin with. The one I have is 32 inches from the grate-bar to the under side of the shell, and is running 20-horse power by measurement. I am burning 800 pounds of screenings per day, or four pounds per horsepower per hour. If this is not a good showing, I would like some of your readers to get up a better one.

INGENIOUS DEVICES.—The *Cabinet-Maker*, in a recent issue, says: Not long since we noticed a very pretty effect caused by using large, nickel-plated round-head screws in putting together the casework of a set, and also by displaying them at other places where they could be made to appear to advantage. Rosettes were put on and held by a single screw. Moldings were fastened by these screws, and they appeared on drawer fronts and doors. They are very odd, and if the thing is not overdone will prove a ten-strike for a big run. Some one else is getting up something very unique. He has had some cast-iron screws made with rustic heads. They are in the shape of little knots, hurls and other marks usually found on branches of trees. One in particular, representing a branch cut off close to the main limb, is very effective. With these screws, our man will take a little table or chair and make a rustic concern of it in ten minutes. The device is not patented, and the man who gets the idea worked down into practice by the wholesale stands a chance of making a good thing.

BOILER INCORUSTATION.—An association of the several boiler inspection societies of Germany has had chemical analyses made of all the secret compositions offered for sale as specifics against boiler incrustation. The number reported so far is 32, and the association recommends that

nons of them can be used. Analyses of several compositions are given, which prove that some are actually harmful to the boiler plates. The profits on the most of them are enormous. One costing 4½ cents sells for 17½ cents; another costs one cent and sells for 6½ cents. In this country, however, there is no doubt but that there are some valuable preparations sold for that purpose, notably a preparation from encalyptos leaves.

THE WASTE OF WOOD.—It has been estimated by competent persons that, comparing the dead weight of a tree as it stands in the forest with the dead weight of the lumber that is obtained therefrom, not more than 25 per cent is actually delivered in the timber market. The remainder consists of limbs and slabs, roots and edgings, and hottings and waste in general, in the forest and at the sawmill. However extravagant and wasteful the timber trade may have been in time past, it may now be noted with satisfaction that, owing to the increased demand in various directions for these so-called waste products, it is likely that the proportion utilized will be reversed, and the loss not exceed 25 per cent, even if it reaches that amount. This is especially due to the growing uses for wood pulp, which now enters not only into the manufacture of paper—in itself a vast industry—but also finds employment in many other directions of almost equal magnitude.

FURNITURE needs cleaning as much as other woodwork. It may be washed with warm soapsuds quickly, wiped dry and then rubbed with an oily cloth. To polish it, rub with rottenstone and sweet oil. Clean off the oil and polish it with chamois skin.

GOOD HEALTH.

The Cancer Discussion.

John Stuart Mill says all reforms have to pass through the three stages of ridicule, argument and adoption. Our readers well know that the history of progress is the history of thought as occurring first in one or a few individuals. We should accordingly be very careful in dismissing as unprobable any departure from preconceived ideas and practices. This practitioner found long since that lard and vaseline as a basis for her salve was useless, hence used cream and now Lanoline. She discovered that no applications were of benefit without the giving of an internal remedy composed of the roots of that herb which composes her salve. Frequent and long-continued massage, when practicable, using the salve each time, is also a necessary part of the "new departure treatment;" also the combination with all these of a gentle galvanic current.

Plasters, as a rule, are objectionable; still, in some cases, their use is indicated. This lady has arrived at her knowledge by induction, based on 18 years' persistent work. We are led to make this allusion to her mode of treatment inasmuch as some inquiries have been made as to "where the remedy can be obtained." There is no "nostrum" to tickle the public pocket; on the contrary, this practitioner says that in the hands of those who could bring more educational facilities and greater experience to bear in the application of her remedies than can possibly be expected from her, there would be an increase in the amount of good thereby effected. She has been industrious, energetic and enthusiastic in her efforts to discover and develop a remedy for cancer. Wanting these qualities, no individual can, in any branch of knowledge, attain but the merest mediocrity.

Many patients live to testify of her skillful treatment. Many when nearing their end have implored her to "do something," as morphia contributed but little to their relief. Could any practitioner turn away from such? Should the inevitable end so soon to overtake these afflicted ones be counted as the ground for rejecting all evidence? This question must be answered at no distant date. The public and those practitioners who may be interested are entitled to hear the evidence; we ask them to search out practitioner and patients for themselves, and have all the information obtainable therefrom.

Epithets and abuse are no argument; nevertheless this is what has marked the language of those who oppose this practitioner's method, and we painfully regret to say, it has been extended to those who have taken an interest in bringing the matter before the public.

As was stated in the beginning of these papers, and as stated now, our object is to ascertain if this remedy has sufficient merits to warrant those who are so disposed in purchasing it for the benefit of the public.

H. F. Winslow, 876 Wood street, Oakland. Age 54. "In April, 1886, I noticed a little lump in corner of right eye; it became irritable, and grew rapidly till the eye was closed. On September 1, 1886, I saw Dr. Wheeler, Oakland. He said it was cancer. On September 2d, I saw Dr. Lane, S. F. He said it was cancer and proposed to cut it out at once, including part of nose, upper and lower lids, the eye, and part of the bony structure about orbit and nose. I then went to —, who said she could cure me without using a knife, and she gave me medicine, applying a salve to try and produce absorption, but failed, so tried a

plaster, and drew out the entire diseased mass in 13 days." *Notes.*—A soft cicatrix, circling around eye; looks perfectly well, and claims to be well.

Mrs. L. W. Pollard, Santa Clara. Age 39; no family. Grandfather and grandmother on mother's side both died of cancer. Her father, George Daggett, had cancer of lower lip, extracted by —, Sept. 2, 1881. No return. Mrs. Pollard "noticed a lump, walnut size, in her right breast; had spells of darting in it, breast slightly swollen, could move the tumor no more than a rock. Kernels appeared under her arms, nipple became slightly retracted. Saw Dr. Toland and Dr. Lane. They said it was cancer and proposed to operate. Left breast then became affected, and was 'working' all that time. Visited —, March, 1879, but could not remain in town and returned to the San Joaquin valley, where I resided at that time. Saw — for second time in Nov., 1879. Lump still increasing and becoming very painful. Took some medicine from — home with me and oams for regular treatment on January 23, 1880. It was then the size of a hen's egg, immovable, and most painful. Tumor in left breast painful, flatish, dollar-size, and growing upward. Left perfectly cured—there has been no return." *Notes.*—Patient looks well. Breasts healthy; skin never has been broken. Says "the lumps gradually disappeared." Seven months under treatment.

Mrs. James A. Linscott, Watsonville. Age 35; 1 child; mother's aunt died of cancer. "First noticed one year ago small pimple on lower jaw, right side, shooting pains in it; glands enlarged in neck; size of 10-cent piece; at end of three months discharging and spreading gradually. Saw Dr. Fagan, Santa Cruz; proposed to cut it out, as all his endeavors to heal it were unavailing. Saw Dr. Rogers, who also proposed an operation. Dr. Breyfogle also failed to heal it by applications. Visited — June, 1886. First week applied her salve; following week applied her plaster and it dropped clean out, leaving a hole." Scar long and soft. Looks well and claims to be well.

Regular Exercise.

Second only to the nourishment of the blood by food is the regulation of that action of all the vital organs by exercise. That exercise which is undertaken spasmodically and at uncertain intervals is injurious rather than beneficial. Judicious exercise for brain-workers is that which causes the blood to flow freely, and affords a change of position and action to the cramped and wearied muscles, in addition to some slight interest calculated to insure a change of thought and consequent relaxation to a tired brain. It should be taken out of doors and in the sunshine if possible, because sunlight is an important source of physical vigor.

Failing of open-air exercise, absolute purity of the surrounding atmosphere is imperative, because its respiration furnishes to the blood that quantity of oxygen necessary to the process of destructive assimilation, which restores vitality and tones the nervous system. The condition of the nervous system affects the secretion of the gastric juice, and, of course, its deficiency occasions impaired digestion. When one has been writing several hours in a badly ventilated room, or in one lighted with gas, exercise in pure air is required to supply the blood with oxygen, and thus prepare the way for the proper nutrition of the brain, nerves and muscles from the next supply of food.

With the brain-worker, whether he be literary man, lawyer, speaker or merchant, exercise replaces that degree of manual labor upon which the health of the average workman depends; but he should never be led astray by the idea that violent physical effort can, in any way, counteract the weariness arising from excessive mental toil. Exercise to the point of fatigue is suicidal to brain-workers, it is simply the killing of a half-dead man. The best time for gentle outdoor exercise seems to be about mid-afternoon, if it can be taken without exposure to excessive heat; the sunlight has chemical properties which act tonically upon the system. Early morning exercise has been favored, but it is as much to be reprobated as early mental or physical labor, because at that time vitality is at its lowest ebb, and it needs stimulation rather than further depletion; certainly, none but the gentlest exercise should be taken until the exhausted system has been supplied with abundant nourishment.

Not only should we exercise properly, but we should live temperately; we must not make exercise subservient to grossness of living, for we will suffer as did the ancient Greeks and Romans from premature exhaustion of the various forces of the body. Exercise is, in short, the helping hand, stretched forth to assist and enliven the various daily functions of the human framework, whereas the other condition is dragging it through the mire. With the ancients, as it should be with ourselves, age was obviously held to be a relative affair. In those days men of mature years exercised daily, in order to ward off old age. With them, also, the exercise of the muscles, and consequently the whole body, was simply a part of their education. At that period the whole art of education was embodied in *mens sana in corpore sano*. This soundness proceeded from the mutual balancing of the two forces, the physical and mental, which could alone result from the perfect harmony in the working of the several parts of the human frame.—*Manufacturer's Gazette*.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

PLYMOUTH.—Cor. Amador Dispatch, April 9: All our mines are driving ahead as if they had only one more day to work. The Con. Plymouth's yield grows no less, and the energy with which her genial superintendent seems to be driving things, and the many improvements he is making, together with the promptness with which each month is met with their paydays, leaves no doubt as to the enormous product of this wonderful mine, which in a few days will have 160 stamps thundering away upon the ores sent to the top. The New Chicago and New London are running at full blast, and we think in the near future that there will be two more mills erected, if we can judge from the character and amount of ore raised from their respective sinking. The New London has her shaft down now over 900 feet, but do not propose to stop their sinking until they have reached 1000 feet; then levels will be run and another big mill added to the list on the great mother lode. Mr. A. J. Gregg, of Oakland, who owns 3500 feet on the mother lode adjoining the Alpine on the north, has subdivided the property into three parts and put them on the market at an aggregate price of \$10,000.

KENNEDY.—Amador Ledger, April 9: Everything pertaining to this mine is being conducted on a scale that indicates permanence. L. Newman & Co. have been awarded the contract of supplying timbers. Sam Williams has taken a sub-contract for hauling the timbers from the vicinity of the old Brandon mill. He bought four fine mules this week from F. Statts for \$580, and will put a six-mule team to work as soon as the roads will permit. There are 1200 logs now ready to be hauled, and it is thought the company will require from 3000 to 4000 timbers the coming season.

MISCELLANEOUS.—Some quartz taken from the shaft of the Middle Bar gold mine may be seen at Ginocchio's store. The ore is of a hard, flinty character. It carries considerable sulphurets of a bright yellow color. No free gold is visible to the naked eye. How such rock would yield by mill process, it is impossible to say. It is dissimilar in many respects from the general character of ore met with along the mineral belt. It is neither ribbon rock nor of the greenstone formation. We were shown the other day samples of quartz from the Amador gold mine near the Moore. The specimens were taken from the bottom of the shaft, which is now down about 150 feet. The quartz is very similar in general appearance to that met with in the Zeile and the Moore. It is plentifully charged with sulphurets. Sinking is progressing at the rate of about one foot per day. The rock is exceedingly hard, but the present contractors are making better progress than under the preceding contract. The Cosmopolitan mine on Dry creek, beyond the Gover and Seaton, shows a vein on the surface 40 feet wide, which prospects well in free gold. A tunnel is being run to cut the ledge further in the hill. It is intended for a permanent drain tunnel, and also to aid in determining the most desirable place for the shaft and hoisting works. A blacksmith shop has been constructed, and timbers are being hauled for use in the tunnel. Henry Sherwood, a mining expert, visited the Doyle mine in Hunt's gulch last Monday, for the purpose of reporting upon the same to English capitalists, who are desirous of investing in promising mining properties in this county. They represent almost unlimited capital. Work has been resumed on the Original Amador mine at Amador City. A building is being erected over the shaft. The machinery for the new mill at Quartz mountain, on what is called the Goodman mine, has arrived at Ione and is being hauled to the ground. Jake Griesbach is negotiating for the sale of his mine in Pioneer district to parties from San Francisco, for the sum of \$6000.

Calaveras.

WEST POINT.—Calaveras Chronicle, April 9: Mining is progressing finely, and the general outlook promises a prosperous spring and summer. The leading mines continue to yield the usual amount of dividends. The Keltz mine continues to turn out good ore and ships a portion of it to Selby's. Fifteen men are employed at this mine. The Lockwood mine development and production of ore continues with unrelenting activity. Two sets of hoisting works are kept continually in motion. The south level in the north shaft is yet being driven in good ore, being 100 feet in length; size of ledge in level is from one to five feet in width; average value, \$300 per ton. Forty men are employed at the mine and reduction works. The Scorpion mine is looking very well in bottom level. The body of ore, as far as explored, is nearly 100 feet long; average size of ledge is one foot of a heavy sulphureted ore. The management of this mine is exemplary and ought to be followed by others in this district. They hire only faithful, experienced and skillful miners, and a great deal of the work is done by contract, and this is the big item of the success of a mine. The Scorpion company has dispensed with its Tustin pulverizer and has just completed a 5-stamp mill, which will start crushing by next Monday. Twenty men will be employed in this mine shortly. The Chino mine is being worked by Mr. Novell. Levels are being run, and we hope soon to have the pleasure of chronicling a big strike. Perkins Bros. & Rowe are about to sell (or at least rumor says that they will receive \$100,000 for their group of mines) to an English syndicate. This includes the Billy Williams, Barnes, and the old John Henry. These are good mines and will pay by first-class management.

AROUND ANGELS.—County Record, April 5: The mining interests in and around Angels are looking up. A cleanup was made at the Lane mine last Saturday, and with what result, we were unable to learn; but our informant tells us it was not on the decrease, but to the contrary, thinks it is improving. Just prior to the cleanup we visited the mill, and found the plates looking extremely well. The plates have an inclination of $1\frac{1}{4}$ inches to the foot, are 52 inches wide, and 10 feet in length to each battery. The Angels gold mine, commonly called the Tozier, has been in active operation for the past five or six weeks, and we understand is proving satisfactory. The mill has been shut down for a short time, for

the purpose of making some improvements. It is the intention of the superintendent, Mr. G. Fox, to displace the J. B. Low mills, two in number, which have been in operation at this mill for some time past, and which have a capacity of 20 tons each, in 24 hours, for an improved mill with more crushing capacity. In addition the mill also has four Frue vanners. The Osborn mill at Smith's Flat is turning out the filthy lucre at a rate satisfactory to the owner, Mr. G. Osborn. The Waterman mine is running steadily day and night. A cleanup was made recently which yielded handsomely. An examination of the plates showed amalgam in no small quantity, which clearly demonstrates that the gold is in the ore.

ANOTHER RICH STRIKE.—Prospect, April 9: The Esmeralda mine on Indian creek, so favorably known for the remarkably rich paychutes heretofore discovered in it, has just outdone all previous performances. A few days ago another strike was made, this time in the west drift. The rock is of a bluish white color, of an extremely fine character, and of the very richest kind, the vein being four feet wide. There is every indication that the Esmeralda will prove to be one of the rich mines of the State. The engine and boiler at the Plug Ugly gravel claim has been removed to the Woods quartz claim on Indian creek, near Sheep Ranch. Mr. Woods was in town the latter part of last week, having the machinery taken down and hauled off.

El Dorado.

KELSEY.—Mountain Democrat, April 9: The Gopher-Bolder mine of this place, of which so much has been written, is gradually developing into one of the finest mines in the county. The owners of the property are energetic, live business men, and contemplate pushing the mine to its fullest capacity. At the present time there are several tons of very good ore on the dump, which have been taken from drifts and the main shaft. The company is making preparations for the erection of hoisting-works. As yet the owners have not developed this property to any great extent, but enough has been done to ascertain that it will undoubtedly make them prosperous and happy men yet. Take it all in all, our quiet burg bids fair to become one of the most promising mining districts on the divide, and that, too, at no distant day. The quartz ledge, known as the Kelley mine, is now leased to an English company. The mine will no doubt prove a bonanza if the rock continues as rich when they sink as it is a short distance below the surface. They intend putting men at work taking out ore, and will erect a mill the present season. Warf and Page are still working in the vicinity of the Galt mine. They report finding fine prospects of gold in paying quantities.

CENTENNIAL.—Georgetown Gazette, April 9: Work on the Centennial mine, near Butcher ranch, is being pushed ahead as fast as possible. A contract has been let to build a road, and we hear that H. S. Morey, of Placerville, is to furnish a ten-stamp mill for the mine.

Inyo.

VALUABLE ORE.—Register, April 9: Broder & Co., of Deep Spring, shipped two tons of ore last week, valued at \$1500 per ton. It was taken from the Cliff mine at that place.

Nevada.

A VERY RICH FIND.—North San Juan Times, April 9: Rumor has it that Messrs. Humphrey Calanan and Robert Holland, both of Cherokee, discovered a quartz vein, or lode, the other day, not far from the town of Cherokee, and four miles from this place, which is two feet wide (the ledge, not the town) and is rich in free gold. The whole country above here is excited over the matter, and lots of men are and have been for a week or so past out prospecting. The young men who found the rich vein keep their own counsel and will not disclose the location of their find until they have complied with every requisite of the laws governing the location of quartz claims.

Placer.

MAYFLOWER.—Placer Republican, April 9: Work was suspended in the shaft of the Mayflower tunnel a week ago Sunday, on account of the water, and the men are now working only on the face in the tunnel which is in 2200 feet. About 300 feet have been made on the two faces at the bottom of the shaft, so that one-half of the whole tunnel has been accomplished. Superintendent Chapellet says that contractor Boyle wants to throw up his contract, and that if he does the company will itself finish the tunnel. It will require about a week to pump out the shaft, and it is thought that the whole tunnel will be completed in less than five months.

San Bernardino.

WEST CALICO.—Calico Print, April 9: Recently Robert Anderson sold his interest in the Little Waterman to Dan Taft and C. R. Knapp. This mine is situated in West Calico near the Sue, and is a fine prospect, having yielded its original owners \$8000 or \$10,000. There is still considerable ore in sight, and it is the intention of the present owners to develop the property into a first-class mine. T. H. Eckles is working on the Inevitable, and his partner, E. Woolman, on the Little V. adjoining, and both mines are showing up well and have been for months, occasionally rich pockets being discovered from which they realize liberal dividends. These mines are as good as banks, with no signs of "suspension of payments." During the forepart of the past week surveyors were engaged in determining the boundaries of the Harmonial No. 1 and Zephyr mines preparatory to applications for patents.

Shasta.

IRON MOUNTAIN.—Courier, April 9: The owners of the Lost Confidence mine, Iron Mountain, have out over 300,000 (?) tons of milling ore, enough to keep the works going for over a year. The roaster and mill is kept going day and night, and is not allowed to get cool. The successful working of this ore on the ground teaches the lesson that hundreds of mines containing similar ore can be profitably worked under the right process, and we understand that the process is very simple and not unduly expensive.

PUMP.—Shasta County Democrat, April 6: A large Cornish pump is being put in at the Gem mine at Lower Springs. Development work on the Little Maud mine on Iron Mountain is proving that mine to be valuable. The Day mine, Old Diggings, is under attachments and in the hands of a receiver. Sam Jones "struck it rich" on the west side of

Muletown mountain last week. He discovered a well-defined vein, though small, that yields ore enormously rich in free gold. He has been mortgaging ore that pays \$1 a pound. Last week Ollie Whittion and Mont Love discovered a four-foot ledge near Shumaker Springs, in Big Backbone, samples from which assay \$25 to the ton in gold and silver. John P. Jones, the senator, owns one of the best mines near Muletown, on Clear creek, there is in this part of the State. It is patented, and he has owned it for the last 20 years, and will neither sell, lease nor work it. There is a shaft on it 150 feet deep. The last ore worked nearly 20 years ago yielded about \$60 to the ton. He has kept a man on the ground all the time, and recently ordered that the old tunnel be cleaned out. The fact that he has had the tunnel cleaned out indicates that the senator intends to reopen the mine shortly. The arastra at the Calumet mill, below battery, silver plates and concentrators, saved on its last run 16 per cent of the gold product. At no time has it run below 12 per cent. This arastra is one of Paul's inventions.

Sierra.

DEVELOPMENT.—Mountain Messenger, April 9: The prospect for considerable further development of the ridge at the head of Goodyear creek, the coming summer, bids fair at the present time, as Eastern parties are becoming interested who are willing to put up money to run back the main tunnel. The main tunnel is in 1650 feet on the Gold Bluff quartz ledge, and a side tunnel being run northwest toward the main ledge, by survey 34 feet ahead.

Tehama.

RICH PLACERS.—Red Bluff People's Cause, April 9: Quite extensive mining development in placer mining is going on on Clover creek, east of Millville. The Millville Mining Company has completed its ditch, and this week its pipe will arrive from San Francisco, which will be laid as soon as possible. Then piping will commence. Young Martin, of Millville, and others have located 160 acres lower down on the creek, which prospects remarkably well. The gold is generally heavy. One nugget, weighing 50, was picked up, and smaller chunks are frequently found. Young Martin thinks he can pick and shovel into a sluice-box on his ground \$6 a day to the man; good ground that. We are informed that about four miles of ground on Clover creek prospects first-rate, all of which can be covered with water.

Trinity.

RAY FORK.—Trinity Journal, April 9: The quartz-mill is not running, as the roads are too bad to haul quartz from the mines. It is said that the men who undertook to find a ledge in the Farmer mine have succeeded; also, that Frank Marsh and T. Greenleaf have discovered a ledge which prospects well in their mine up Kingsbury gulch. Seales & Rennie are still taking quartz from their mine, and the indications now are that they have a rich ledge.

Tuolumne.

TO BE DEVELOPED.—Tuolumne Independent, April 9: Dave Levy has succeeded in reorganizing a strong company to develop the "Old Tuolumne" mines, above Columbia. Mr. Randolph C. Davis, a practical and experienced miner, will take charge of the property, and under his able management we may expect large results. Several valuable ore bodies are already uncovered, and hoisting works, pumps, etc., are already on the ground. These mines, from work already done, are known to be valuable. A sufficient working capital has been subscribed to keep the work of development progressing right along.

Ventura.

PIRU DISTRICT.—Santa Barbara Press, April 5: The ore of the Piru district is free milling, gold predominating in the assays over silver or the baser metals. The Esperanza shaft is down 80 feet, and the ore brought to the surface runs about \$8 for mining and milling. Eight ore veins run through this company's property. Hoisting machinery for the Esperanza has already been purchased, and as soon as Mr. Harper returns from San Francisco, a ten-stamp mill will be erected by the company. Mr. Harper will serve in the capacity of superintendent at the mines, and he states that the property will be actively worked for all there is in it.

NEVADA.

Washoe District.

CON. CALIFORNIA AND VIRGINIA.—Enterprise, April 9: On the 1300 level, the north drift from west crosscut No. 1 was advanced 40 feet; total length, 129 feet. South drift No. 2, from east crosscut No. 1, was advanced 30 feet; total length, 124 feet. This drift is still showing ore which gives fair assays, and it will soon connect with the upraise above the 1400 level. On the 1400 level, raise No. 2 was carried up 15 feet; total length, 87 feet. It still continues to show ore of average quality. Raise No. 3, above the main north drift, has connected with the old stopes. On the 1435 level still continue stopping out the usual amount of ore from the bottom of winze No. 2, 105 feet south from the south line of the Ophir mine. On the 1500 level the south drift was extended 40 feet; total length, 685 feet. During the week 38 bars of bullion, valued at \$140,000, were shipped to San Francisco. The pulp assays average about the same as last week, and the shipments to the Morgan and Eureka mills were about the same.

BALTIMORE.—Are cleaning out the main drift on the 300 level. This drift was run to the ledge some years ago, but no prospecting from it was then done. A raise will now be made in the vein up to the 225 level. On the 400 level are cleaning out the south-west drift preparatory to extensive prospecting. On the 500 level, where the vein was cut out about two weeks ago, and good ore found, no work has been done for several days. There was so much water and slum in the drift that not over an inch a day could be made in the work of cleaning it out, as it was constantly flowing forward. This being the case, the drift was left to drain out.

CHOLLAR.—The hoisting apparatus at the Sharon shaft on the croppings is working well and smoothly. Ore is now being regularly hoisted from the 350 level. Good progress is being made in cutting out the station at the 400 level of the old Chollar shaft. From this a drift will be run to strike the Sharon shaft at a depth of 400 feet. Drifts will also be run in other directions from this point. The drift on the 1300 level that is being run by the Nor-

cross folks yesterday had but 50 feet to go to connect with the old Chollar incline.

OCCIDENTAL.—In the upper tunnel the south drift from the north incline winze was extended 10 feet; total length, 188 feet. West crosscut No. 2 was advanced 8 feet; total length, 46 feet. West crosscut No. 3 was extended 10 feet; total length, 35 feet. Extracted to tons of milling ore from the above-mentioned openings. From the station on the 100 level of the north incline winze the south drift was extended 15 feet; total length, 59 feet. The north drift was extended 12 feet; total length, 46 feet. Each of these drifts shows narrow stringers of ore.

GOULD AND CURRY.—On the 425 level the south-west drift from the main south drift was advanced 40 feet; total length, 144 feet. The face is in porphyry. On the sixth floor the upraise, 42 feet above the track floor, is in quartz, some of which shows milling value. On the 300 level the south drift from the east crosscut was extended 15 feet; total length, 48 feet. It is in clay and quartz showing value. A north drift from the west crosscut was advanced 25 feet; total length, 85 feet, and is in porphyry and quartz.

SAVAGE.—The upraise above the 600 level continues in good ore. It is up 20 feet, at which point good ore is being stoped out. On the 800 level the south drift from crosscut No. 3 has been advanced 18 feet, all the way in quartz. An east crosscut from this drift has been extended 20 feet in quartz which gives good assays. No. 1 east crosscut has been started from the main lateral drift on this level. It is now out about 15 feet.

HALE AND NORCROSS.—On the 1300 level the main south drift has been advanced and timbered 50 feet. The face is now about 50 feet from the old Chollar incline, with which it will connect in about a week. On the 1200 level the north drift has been timbered for a distance of 40 feet. On the fifth station level, the south drift has been extended and timbered for a distance of 25 feet.

HAYWOOD.—About 30 miners are employed and sufficient ore is extracted to keep the Thompson and Briggs mills in operation. A prospecting drift is being run toward the hanging-wall on the 200 level. It has already shown up a large body of fine ore. The management expect to put on a third mill in a short time—as soon as it can be obtained.

BEST AND BELCHER.—On the 800 level west crosscut No. 4 was extended 22 feet; total length, 234 feet. The face is in porphyry. On the 1300 level east crosscut No. 1 was advanced 75 feet; total length, 341 feet. East crosscut No. 2 was advanced 65 feet; total length, 278 feet. Both are in vein porphyry.

YELLOW JACKET.—Are extracting and sending to the mills 160 tons of ore a day. This ore is coming from the 1300 and 1400 levels. Prospecting is in progress at several points between the 1300 level and the roots of the sagebrush. At one or two points some good milling ore has been found, but no very extensive deposits as yet.

BELCHER.—Are extracting and shipping 100 tons of ore a day. This goes to the Santiago mill. The Vivian mill, which has been crushing Overman ore, will soon be put to work on ore from the Belcher. A full force of miners has not yet been put to work in the ore-producing sections.

OVERMAN.—The usual quantity of ore is being taken out on the level of the Petaluma-street tunnel. This has been crushed at the Vivian mill, but as the Belcher folks now want that mill, it will be necessary to make new arrangements for the reduction of the ore of the mine.

ALTA.—The rock in the face of the drift on the 825 level still continues hard. It has about 160 feet to go to connect with the winze down from the 725 level. The Keystone raise from the 725 level is up 140 feet. It is still following the banging-wall.

MEXICAN AND UNION CONSOLIDATED.—On the 1300 level the joint Union and Mexican drift, running northeasterly, was extended 22 feet. This drift is now 426 feet in Mexican ground. The joint Mexican and Ophir east crosscut was extended 15 feet; total length, 319 feet.

IOWA.—Work is going on at the usual points. Superintendent Curtis is now below in search of suitable machinery for crushing the gold quartz that has been found in considerable quantities in several of the openings made.

UTAH.—On the 472 level the north drift from the main west drift was extended 45 feet; total length 458 feet. The face is still passing through vein porphyry and quartz, the latter showing value by assay.

CROWN POINT.—As yet a full force of miners has not been put to work, but they are now extracting 130 tons of ore a day, which is being worked at the Mexican mill, on the Carson river.

OPHIR.—On the 1065 level west crosscut No. 1, from the south drift, was extended 42 feet; total length, 195 feet. East crosscut No. 1 was advanced 30 feet; total length, 362 feet.

SCORPION.—The east drift on the 300 level has been advanced 30 feet; total distance east of the shaft, 270 feet. There has been no change of material during the past week.

BULLION.—Are making fair headway in the east drift on the 200 level. It is still in porphyry. The work of cutting out the station on the 300 level is progressing favorably.

JUSTICE.—Work in the drifts on the 250 and 300 levels is progressing as usual. Some good milling ore is being taken out in making explorations on the two levels.

ANDES.—A considerable amount of prospecting is being done on the 200 and 300 levels, and the usual amount of ore is being saved for milling.

OEST.—A new horse-whim has just been set up, and much excellent ore is now being raised. Some of the quartz shows well in free gold.

ALPHA AND EXCHEQUER.—Good headway is making in sinking the shaft below the 120 level.

ATLANTA.—The new tunnel is being pushed ahead with two shifts of miners.

VIVIAN.—The usual amount of good milling ore continues to be extracted.

Aurora District.

THE CAMP.—Walker Lake Bulletin, April 6: Springtime has struck Aurora, everything looks pleasant and everybody feels hopeful. As yet, business

is very quiet, but the prospects are bright. The arrival of Mr. Ann will be the precursor of a renewal of work on the company's mines and other mining property now in litigation will soon be relieved from the embarrassments of legal proceedings. In the meantime, the Silver Lining is still working the usual number of men, and good progress is being made. The upraise is being pushed as fast as possible and connection will soon be made. The ore is looking well and bullion will be produced in a short time.

Central District.

GOOD ORE.—*Silver State*, April 9: S. W. Ruse went down to Central district a few days ago, where his father is at work on the Emma Nevada mine. He brought up a sample of the ore and it assayed \$644.10 in silver to the ton. It there is much of that kind of ore in the mine it will pay, if silver is down to 93 cents an ounce.

Columbus District.

AN IMPORTANT DEVELOPMENT.—Walker Lake *Bulletin*, April 6: On Sunday night the two ledges of the Georgene mine were struck in the lower shaft level, and ore was hoisted from the shaft on Monday. This is a most important development, and will probably make the Georgene the leading mine of the county. The indications are that the force will be doubled in a short time, and generally the outlook of Candelaria has become very promising.

THE MOUNT DIABLO.—The Mount Diablo force is being increased daily and ore is being piled up in heaps at the mill. Large quantities of ore are stored in the tunnels ready for hoisting and the reserve in sight was never so large as at present.

Eureka District.

ORE SHIPMENTS.—*Sentinel*, April 10: During the past week ore shipments were made from the mines of the district to the Richmond works—Avon mine, 12 tons; Massachusetts, 1 ton; Silver Connor, 11 tons; Robinson, 5 tons; Hoosac, 3 tons; Eureka tunnel, 15 tons; Dunderberg, 77 tons; White Pine, 2 tons; Roslin, 12 tons. To the Eureka Con.—Fraser & Molino mine, 1 1/2 tons; Lincoln, 1 1/2 tons; Harris, 2 1/2 tons; May, 1 1/2 tons; Silver Lick, 1 1/2 tons.

Tuscarora District.

NORTH BELLE ISLE.—*Times-Review*, April 8: Fair progress has been made with the work at all points. North gangway, 400-foot level, has been extended 20 feet.

BELLE ISLE.—East crosscut, 250-foot level, has been advanced 5 feet. Rock extremely hard. Line crosscut, 150-foot level, advanced 5 feet; total length, 121 feet. North drift from same extended 10 feet; total length, 82 feet.

NAVAJO.—During the past week have cut out and started a winze on the east vein 75 feet south of No. 3 crosscut, 150-foot level, to prospect the vein below that level. South crosscut from line crosscut, same level, advanced six feet; total length, 55 feet. East crosscut at south end extended 10 feet. South drift on west vein extended seven feet. No material change in any of the workings.

NEVADA QUEEN.—Operations were suddenly and entirely suspended on Wednesday morning by the total destruction of the works by an explosion of giant powder. Superintendent Coffin authorizes the statement that the works will be rebuilt just as soon as lumber can be procured. There is at the present time, however, none on hand in the yards in Truckee, but the mills at that place will start up next week, and it will take but a few days to fill the orders from here. The roads between this place and Elko are improving every day, and no fears need be entertained of any delay in freighting from the railroad.

Willow Creek District.

MINERS AT WORK.—*Cor. Silver State*, April 7: The Planet mine, owned by Choat Brothers, is a gold-bearing lead, and is situated on the north fork of Willow creek and on the east side of Gold hill, and on this mine there is a tunnel run into the hill on the ledge about 100 feet with good pay ore all the way. A winze was sunk on the lead 50 feet in depth, and had from two to three feet of good pay ore. This winze was sunk about 20 feet from the face of the tunnel, which will make the depth on the ledge 100 feet, and the ore they extracted from the tunnel and winze in drifting and sinking is 100 tons, which they intend to work immediately in two astras, which are run by water-power, with the capacity of about three tons in 24 hours. The Denmark mine, owned by Chris. Raabe, is on the same lead as the Planet. This mine is on the forks of Willow creek, and has a shaft sunk on the ledge 50 feet, with good ore from top to bottom. A lot of it has been shipped to the Reno reduction works, and will speak for itself. There are several tons on the dump which he intends to work in an astras and will start it up about the 1st of May, and all of this ore was extracted in sinking. The Golden Era mine is owned by H. H. McColley & Co. This mine is situated on Gold hill, and has a tunnel run on the lead 100 feet; the ledge being from two to six feet in width. There has been some very rich ore extracted from this mine. This ore lays on the dump, and free gold can be seen in it without the aid of a glass. H. H. McColley intends to resume work on it in a few weeks and make it a paying mine. The Mammoth mine is owned by Shrewsbury & Wilson. This mine is situated on the top of Gold hill, running north and south, and is about 1000 feet above the level of Willow creek. The lead is 25 feet in width. The formation is slate and quartzite. Twenty feet from the surface there is a crosscut run from the footwall to the hanging, which is 25 feet, and on the hanging-wall there was two feet of good ore. At this point a winze was sunk to the depth of 40 feet, with two feet of good ore all the way. There is several tons of choice ore on the dump, which they intend to work as soon as possible. The Jeff Davis mine, owned by J. B. Bowden & Co., is the south extension of the Mammoth, and has several tons of ore on the dump, and is about to be sold to a San Francisco Co. The Iowa, owned by Harris & Drummond, is a silver mine, and is situated about one mile from Willow creek. Several tons of ore extracted from this mine and worked in H. H. McColley's mill gave good results; it is a fine-milling ore. Mr. Harris has resumed work on it, and has about 100 tons of ore on the dump that will assay from \$50 to \$100 per ton, and from what can be seen it is a very promising mine. H. H. McColley has resumed work on his Flat creek mine. This mine is the extension of the Wild Deer, which looks very favorably.

ARIZONA.

BIG MILL.—*Prescott Courier*, April 9: The Vulture mill will shortly have 180 stamps. There are thousands of tons of gold rock in sight. A large mill will soon be erected near mines recently purchased from W. H. Robbins & Co., in Bradshaw district. All miners who have worked to the Peck and Occident are of the opinion there are great quantities of ore under the water. If so, Alexandra will shortly have a large population. The Peck, if memory serves us correctly, yielded nearly \$2,000,000 in a short time—that, too, with the poorest sort of management. Brooks & Ferguson have sent in a lot of rich ore to the sampler. Mr. Slack has leased the Happy Jack mine, Lynx creek, struck a fresh body of high-grade ore, and is delivering a lot of 20 tons at the sampler. Several small parcels of placer gold were received here yesterday. Another large shipment of silver was this week made from the Tip Top mill. Chlorides of Humboldt district shipped \$30,000 worth of ore last week. Mr. Jones, one of our energetic mining men, returned here yesterday from the East, where he purchased machinery which will be added to the Azlan mill, Groom creek. His intention is to start the mill some time this month and learn, by actual working test, the process that is best calculated to work ores of this section.

TOMBSTONE.—*Democrat*, April 4: Machinists are now engaged in examining the machinery of the Grand Central hoisting works, and it is very likely that this means a rebuilding of the property and a resumption of work on the hill. There is now more activity among the mine-owners than for a long time, and taking everything into consideration, the *Democrat* feels safe to predict and almost assert that before many moons the city of Tombstone will be in the midst of a permanent and substantial boom.

COLORADO.

RIO GRANDE COUNTY.—*Rio Grande Prospector*, April 7: Foreman Arthur Burton, and Assayer E. C. Koch, of the Anne Company, Summitville, brought in another gold brick last Sunday. This brick is valued at \$31,450, is 914.6 fine, weighs 1663 ounces, and is the product of 23 days' run of 40 stamps. Less than a month ago, the same company landed at Del Norte a brick worth, according to late New York assay, \$33,147.71. This brick was the product of 28 days' run of an average of 50 stamps. It weighed 1691 ounces, and was 948 fine. The Little Annie Company has just realized \$8600 from 29 tons of concentrates shipped to Denver recently. Here we have a product in gold of over \$73,000 from an average of less than 50 stamps in 51 days. The gold bricks have been landed at Del Norte and handled by many of our citizens, so there can be no mistake about it. The concentrates are included in this estimate, without which the output amounts to \$64,597.72.

IDAHO.

AROUND KETCHUM.—*Keystone*, April 7: The rapid disappearance of the snow from the mountains and the advent of the genial, warm days of spring are hailed with delight by the miners, as both combined give promise of an early reopening of roads and the speedy resumption of active operations. A long and tedious winter always has a depressing effect upon a mining camp, and to worry through it requires more than little patience. The first indications denoting the throwing off of the icy fetters and the advance of spring are anxiously watched for, and as the days gradually grow longer and longer, and the great banks of snow succumb to the warm rays of the sun, time passes much quicker, while the lethargy of winter is shaken off and preparations begun for the work of another season. Every indication points to a season of unusual activity about the mines during the coming months, and when once operations have commenced they will be continued on a far greater scale than heretofore, until the storms of another winter drive the wrestlers of earth's hidden treasures back once more into more reasonable and comfortable quarters. It is very probable that the mines on Warm Spring creek, Bassett gulch and Boyle mountain will cut an important figure in the output of ore next season. During the winter a great deal of work has been done, attended with more or less success, and a good showing is made as a result. The owners of a number of claims in these localities are highly pleased over the prospects and intend to prosecute the work on their mines more vigorously than ever at the earliest possible time after the roads are again in traveling condition. The reports from Smoky district are of the most encouraging character, and new strikes are reported every few days. It is anticipated that at least 400 men will be at work in the several mines and upon claims by next June, while some put the number at a still greater figure. It is gratifying to be able to record the growing interest taken in Smoky district mines, and the prediction made last year that the district would soon become the great mining camp of this part of the Territory will apparently be verified. Owing to the uncertainties of travel and the worse than no mail facilities at present, only meager reports are obtainable, but all coming in are of the same general tenor and of the most encouraging kind. In the King of the West, Carrie Leonard, Dollarhide, Silver Star, Tyrannis and several others, a great amount of work has been done during the winter and the mines show large bodies of ore. It will be a busy time when shipments can be resumed.

KEYSTONE.—*Challis Messenger*, April 5: Al. Gay was down from the Keystone mine and returned yesterday. He informs us that head partner, Chas. Cook, have taken out a few tons of good ore this winter, while sinking on the chute of ore, and that they have a very good body of ore developed. They have been running a tunnel for the past six weeks, which tapped the ledge below the shaft on Saturday last. They expect to take out a considerable quantity of good ore now in a short time, and to make a good thing before their lease expires.

ROCK CREEK MINES.—*Wood River Times*, April 6: E. M. Morrissey, of the French mine, which lies between the Guy and the Montezuma, on Rock creek, was in town yesterday, and informed a *Times* man that he and his partner, Ed. Mahan, have a good showing in their claim. They run their first tunnel 108 feet without finding the ledge; but the second tunnel (a lower one) struck the ledge when in 50 feet. They have 17 or 18 inches of chloride ore, the assay showing \$291 per ton, and he thinks

it will run not less than \$200 on an average. Mr. Morrissey says that Ole Rorem, lessee of the Guy, which has lain idle for some time, has reduced the water in the mine to the tunnel level, and will begin an exploration at once. The old workings will be used if possible; but if they are so badly caved that it cannot well be done, Mr. Rorem will sink 50 or 60 feet. He is satisfied that the Guy will soon resume its place among the producing mines of Wood River. D. J. Johnson and Al. Long, lessees of the Montezuma, have run a tunnel over 70 feet, and started an upraise. They have a fine showing of ore that runs \$150 to \$200 per ton, and will be ready to ship when the roads permit—which will probably be in two or three weeks.

NEW MEXICO.

SHIPPING ORE.—*Socorro Bulletin*, April 9: The Graphic, Kelly, Grayhound, Cavern, Juanita, Hard-scrabble, Tiptop and Fashion, in the Magdalena district, are all producing and shipping ore. Frank Wilson is working on a 12-foot face of 31 per cent copper ore in the Compromise mine, 40 miles east of this city. The ore in addition contains 38 ounces silver and some gold. Col. E. L. Mann and Mr. Griffith, of the Uncle George Mini & Company, are engaged in uncovering the vein on their extension of their Silver Glance claim, in the Linitar district, preparatory to sinking a deep shaft on the most propitious portion of the lode. It is a good idea, and an example which we would commend others to follow. Too many working shafts are made in a hap-hazard sort of way.

KINGSTON.—*Cor. Socorro Bulletin*, April 9: The camps never looked so well on the middle, south and north Perchas. New and rich strikes are being made every week in the lime belt, and the fissure veins on the north Percha are showing up better and better as development is being prosecuted. Three of the properties composing the Ingersoll group were sold last week for a large sum, not made public, the Ingersoll people, however, reserving the Ingersoll extension.

HERMOSA.—The Pelican-Eagle group is the scene of considerable activity. Twenty-three miners are working on leases and are taking out a considerable quantity of ore which they will soon ship to Socorro. Richard Mansfield White has a number of teams on the way to Engle loaded with ore destined for treatment in Socorro from his Polomas Chief. It is way up ore. The Aetolope shipped ore last week by bull team for Socorro.

GOLDEN.—While the excitement which attended the recent rich strike in the gold placer here has in a measure subsided, the placer miners are still busily at work and are making money. S. P. Conger has struck it very rich on the Canon del Agua grant. He affirms he has rediscovered the old Saint Lazarus mine, of early times, which was worked by Pueblo slaves under the supervision of their task-masters, the Spaniards, prior to 1680. The stamp-mills at San Pedro are running night and day, and the general manager, Mr. Chittenden, has a force of men boring a new artesian well to supply his 25-stamp-mill more fully with water.

MONTANA.

DUNKLEBERG CREEK MINES.—*Cor. New Northwest*, April 9: The Dunkleberg Creek mines, through the energy of your townsman, Dr. A. H. Mitchell, are enjoying a substantial boom. Your correspondent, with Prof. John F. Smith and Wm. Albright, went over the hills to what is now called Mitchellville last week. The first thing that attracts attention is the immense piles of ore sacked up near the company's assay office preparatory to shipment. They are down 80 feet on the Forest Rose, with an incline shaft, and have an incalculable amount of ore in sight that carries from 40 to 50 per cent lead, and from 33 to 55 and 100 ounces in silver. There are eight men employed in the mine. They expect to more than double the force the coming week. There are four men at work at the Bellair, which is also a producer. There are 34 men working in Mitchellville at present. This camp is situated similar to Boulder, only the canyon is not as wide. The trend of the lodes is north-east and south-west. The Forest Rose, Bellair, Little Joe, Stonewall Jackson, and the Contention are the principal producers so far. The last named mine was one of a group sold to Vice-president Oakes, Dr. Mitchell and others last summer by Frank Stalabass. On the 1st of January, Mr. Stalabass came back to his old field and performed a coup d'état—that is, he jumped or made a relocation of most of the leads he had sold. He has a force of five men at work on the Contention, with Helena parties backing him. The owners of the Bellair, Forest Rose and Little Joe lodes are Dr. Mitchell, Wm. Perriman and Frank Carnes. They have been bailing their ore to Drummond all winter, but the railroad company is going to put in a sidetrack for them immediately at a point near Benton Hoover's ranch, which will be their shipping point in the future. There are, altogether, over 100 locations in the Dunkleberg district. A peculiar feature of this district is the formation. On the southeast it is a granite and porphyry and conglomerate where the ore is not so base. Contiguous to this on the northwest side of the gulch it is lime with a quartzite contact. One feature, however, about this district that insures it a prominent place in the catalogue of producing districts, is that it is productive of very high-grade lead ore. Every smelter that has tested it is now bidding for it. There are parties there from Butte now negotiating a bond or lease on the Stonewall Jackson, which is owned by Frank & Dunkleberg. The machinery for the new mill at Black Pine is still at Drummond. They will either haul it up Willow creek right away, or through Henderson gulch, which is the most favorable route for a good country road. They have some 14 men at work in the mines, and while the mine continues disclosing extensive resources, Manager Pack realizes the importance of keeping up exploration work ahead of the extraction of mineral, and levels are being run on the plane of the ore body preparatory to the extraction of the ore disclosed. The lumber is on the ground for the new mill.

THE RENA MINE.—*Butte Inter-Mountain*, April 9: Yesterday Mr. A. C. Ritter, of Argentina, came up to Butte to remain a few days. Knowing that he was recently an owner of a promising mining property near Argentina, an *Inter-Mountain* re-

porter inquired of him for some particulars. The Rena mine is situated in the Montana mining district, about three miles north of Argentina. A perpendicular working shaft has been sunk on the property to a depth of 100 feet. There is also an incline shaft to the same level. A crosscut there shows a well-defined lead of about two feet in width, between well-marked walls of porphyry shale. Thirteen carloads of ore from this mine have already been shipped to Denver and Omaha, and the ore ran on an average \$90 to the ton, two-thirds of which was gold and one-third silver. The ore also goes about 15 per cent lead. The mine was discovered and owned by Witter, Miles & Lawrence, who sold it a short time ago to a St. Louis company for a consideration of \$30,000. The mine is considered very promising.

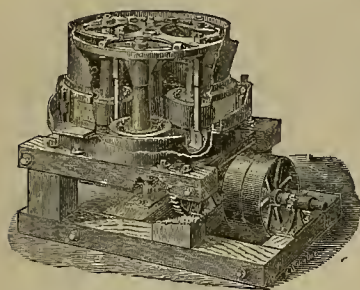
OREGON.

CLEANING UP.—*Jacksonville Times*, April 8: A few of the miners of Josephine county have commenced cleaning up. Haskins, Long & Co., of Star gulch, have finished cleaning up and made good wages while at work. The Sterling Co. is running two pipes day and night, and disposing of a large area of ground. Many of the mines are cleaning up, the continued warm weather having made the water light in many places. Simmons, Decker & Co. and Wimer & Sons, of Waldodistrict, still have plenty of water, and are making the most of it. Thos. H. Berryman, of Applegate, who has one of the best drifting claims in Southern Oregon, continues to do good work there. Smith & Lynch, of Wagner creek, will no doubt make a good season's run. They recently picked up a piece of gold worth \$128. J. Klippel, of Poorman's creek, has washed off a large piece of ground this season, and will not finish cleaning up before the middle of June. D. W. Marsh and J. Baker, two experienced California miners, are prospecting in the Applegate country. They speak favorably of this section. E. Roten has discovered a new ledge in Willow Springs precinct, which shows considerable free gold. There is said to be plenty of this ore in sight. Klippel & Baumele's mill, on Shively gulch, is not making a steady run as yet, owing to the scarcity of quartz on the dump. This deficiency will probably be supplied soon. Miller & Huggins, of Farmer's flat, are engaged in cleaning up, and will be done about the middle of the month. They have picked up several pieces, one of them weighing \$10. Simmons, Ennis & Co., who are opening a large placer claim in Waldo mining district, Josephine county, are making excellent headway, and by next season will no doubt have their huge cut finished and everything ready for piping on an extensive scale. Cornelius & Co.'s mill in Rock Point precinct will commence crushing quartz from the Swinden ledge in a few days. It has been improved and put in good order, and will no doubt do much better work than formerly. A large force is engaged in taking quartz from the ledge, which looks better than ever.

TRAIL CREEK MINES.—*Bedrock Democrat*, April 9: The *Democrat* was yesterday the recipient of a call from Messrs. Earnest Nadeau and John Laundry, who have just returned from a visit to the Trail creek gravel mines, whither they went for the purpose of seeing what the present outlook promises toward this season's operations on these mines. They report the prospects very flattering for a prosperous season, more water running in the ditches than at the same time previous years, and snow on the mountains on an average of six feet in depth. To give our readers a better idea of where these mines are located, we will state that they are due west from Baker City 40 miles, just back of the high, snow-capped peaks that can be seen towering toward the heavens as viewed from our city. They are situated in a low divide between Trail creek and the north fork of the John Day river, the water supply for the working of the mines being attained from the John Day by means of a canal six miles in length and with a carrying capacity of something over 800 inches. These gravel mines are owned by a company of experienced miners under the firm name of Powers & Co., and have been worked for many seasons past with most gratifying results. The gravel banks are to the depth of 60 or 70 feet and the pay dirt extends from the grass roots to bedrock. Operations for the present season will commence in about two weeks, and work will be carried on more extensively than ever. Two Little Giant hydraulics will be placed in position to drive against the immense gravel beds, and a force of some 12 miners to perform the many different offices required in a well-regulated placer mining claim, will successfully operate this valuable property.

UTAH.

PARK CITY.—*Record*, April 9: Surface water handicaps active work in the upper levels of the Crescent, but this trouble will soon be at an end, since the snow on the hills is fast disappearing. The three-compartment shaft that is being sunk on the vein at an incline from the end of the lower tunnel and way in the hill, is going down at a lively rate, having already reached a depth of nearly 150 feet. As soon as the large quantity of machinery arrives, about May 1st, no time will be wasted putting it in place, so that very soon advantageous development work on the Crescent will be pushed, and large quantities of high-grade ore extracted. Since the concentrator has had an overhauling its capacity has been increased to about 30 tons in 24 hours and still a large amount of ore could be treated. Yesterday Ezra Thompson's force of freighters was busy unloading four cars of hoisting machinery for the Daly mine. It will take several days to transport the lot, 50 tons, and daily the balance of the mining machinery, about 80 tons, is expected from San Francisco. At the mine, extensive preparations are going on to receive the mammoth machinery and put it up without delay. It is expected that the new hoisting works will be running by June 1st. A rich strike in the tunnel of the Rochester group was recently made. It is impossible to obtain the particulars of the richness or extent of the vein encountered, but enough is known to justify the assertion that very soon ore shipments will be inaugurated. The operations of the Rochester and the Southern Tier Co. will cause Snake creek to boom this summer. Fred W. Hayt, manager of the Southern Tier, is up at the mine examining the character and extent of the late strike, which is known to be as rich as at first reported.

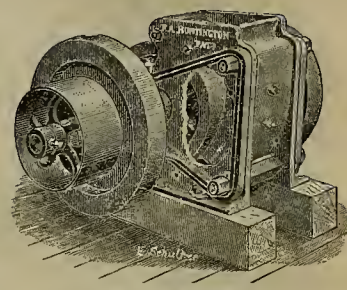


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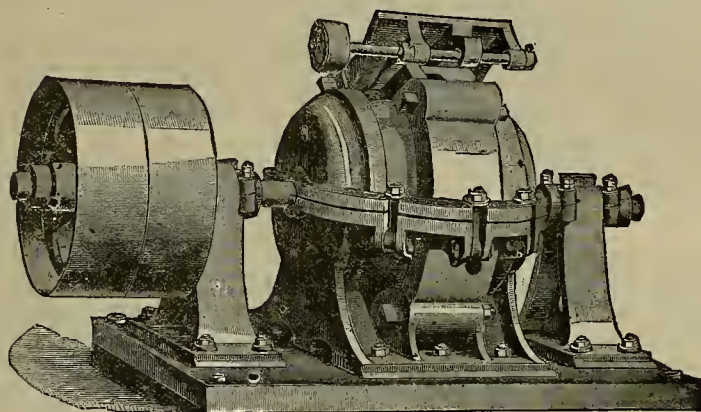
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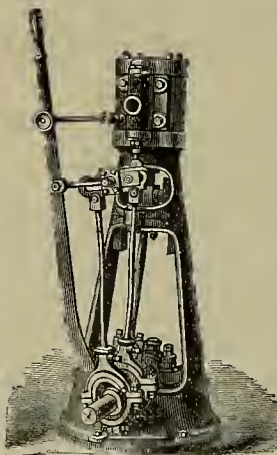
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Assaying and Analyses of Ores, Minerals and Waters.
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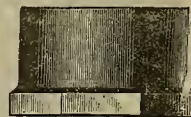
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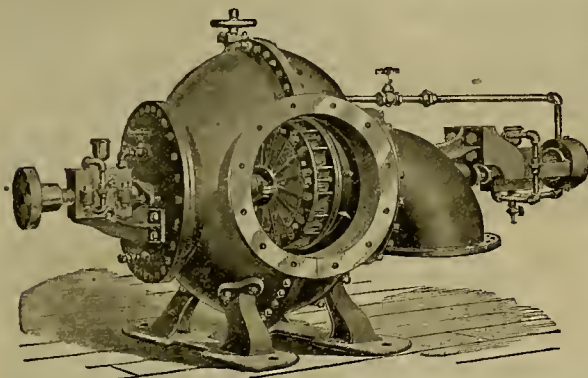
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Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

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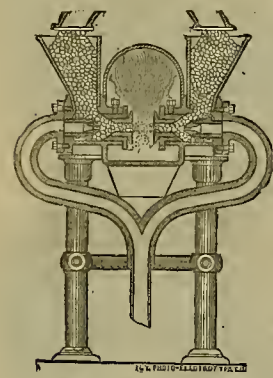
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Experimental machinery and all kinds of metal, tin, copper and brass.

COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

HEALD'S BUSINESS COLLEGE,
24 Post St. S. F.
Send for Circular.
Shorthand, Typewriting, Penmanship, Bookkeeping.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court Department 10, San Francisco:

CRYSTAL SPRING WATER CO. April 8. Object, to supply San Mateo with pure water for domestic purposes. Capital stock, \$50,000. Directors—B. N. Morgan, S. L. Jones, R. E. Rammond, Edward Ziesche and F. R. Drinkhouse.

SIRIEX MARINERS' COMPASS CO. April 8. Object, to purchase, manufacture and deal in improved mariners' compass invented by Leon Siriex. Capital stock, \$750,000. Directors—E. P. Voisard, Leon Siriex, John L. Boone, C. E. McNear, Chas. Gaillard.

CALIFORNIA PRODUCTS EXHIBIT BUREAU. April 8. Object, establishing in this city a bureau for the collection and public exhibition of the products and the native manufactures of California. The Directors are John D. Wagner, S. A. Jones, John Holden, J. W. Miltoe, P. S. Donney, W. W. Brown and Alva Udell.

HERCULES COLD STORAGE CO. April 9. Object to operate in icehouses, ice machines, refrigerator cars, etc. Capital stock, \$150,000, in shares of \$20 each. Directors—Charles L. Taylor, D. E. Francis, P. J. White, Joseph W. Hostetter, Charles Alpers, George B. Mowry, John H. Miller.

EMIL QUARZ CONDENSED COFFEE MANUFACTURING CO. April 9. Object, to manufacture and sell condensed coffee. Capital stock, \$10,000. Directors, John Gray, August Kroeger, Emil Quarz, A. E. T. Worley, Thomas J. Haynes.

Mining Share Market.

There is not much new to report concerning mining strikes. They are inactive, and neither bullion shipments nor ore developments seem to be able to raise prices any.

All is again falling into regular working shape on the Comstock. At the Yellow Jacket mine 165 tons of ore are being hoisted daily; at the Crown Point 130 tons a day are being extracted and shipped, and at the Belcher 100 tons. At both these latter mines more miners will soon be put on and the output of ore increased to the full capacity of all the mills they are able to command.

The Savage ore-producing sections are yielding the usual quantity of excellent rock, and new deposits of great promise are being opened up.

At the Consolidated California and Virginia all is going on well and smoothly in the ore-producing sections. A furnace (the first of two that it is proposed to set up) for furnishing a supply of carbonic acid gas, by means of which to extinguish the smoldering fire in the vicinity of the 1500 level, is now ready for use. Either coke or charcoal will be used in it. Confined as is the smoldering fire in the old works by strong bulkheads on all sides, it is thought that the space can be filled with the gas just as a bottle is filled with water.

New York Metal Market.

Telegraphic advices dated April 14th give the following New York prices:

BAR SILVER—96 3/4 c per oz.
BOKAX—54 1/2 c.
COPPER—LAKES—\$10.40.
IRON—No. 1, \$32.00.
LEAD—\$4.30 to \$4.35.
QUICKSILVER—\$3.25 to \$4.

The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Neglected, spot closing at \$10.36 to —. Transferable notices (Lake) issued at \$10.35 to —. Transferable notices (Chili Bars) issued at \$10.30 to —. Lead—Dull at \$4.30 to \$4.40 spot. Transferable notices issued at \$4.35 to —.

Tin—Quiet at \$22.40 to \$22.50. Transferable notices issued at \$22.45 to —.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, \$22.75 to \$22.90; Billiton Tin, \$23.10 to \$23.40; Banca Tin, \$23.15 to \$23.50; Baltimore Copper, \$10.30 to \$10.60; Orford Copper, \$9.35 to \$9.70; F. S. C. Copper, \$10.00 to \$10.25; Foreign Lead, \$4.75 to \$4.80; Foreign Spelter, \$4.70 to \$4.75.

MAKERS' PRICES—At tidewater. 100-ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$21.00 to \$21.50; No. 2, \$20.00 to \$21.00; Grey Forge, \$17.00 to \$19.00; Hudson River, Grade No. 1, \$21.00 to \$21.50; No. 2, \$20.00 to \$21.00; Grey Forge, \$17.00 to \$19.00; Southern, Grade No. 1, \$21.50 to \$22.00; No. 2, \$21.00 to —; Grey Forge, — to —.

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, April 14, 1887.	
ANTIMONY—French Star.....	9 1/2 @
BOKAX—San Bernardino.....	7 1/2 @ 8
ARMAGAS.....	4 @ 5
IRON—Glenbrook ton.....	— @ 27 00
Eglington, ton.....	— @ 25 50
American Soft, No. 1, ton.....	— @ 23 00
Oregon Pig, ton.....	21 00 @ 23 00
Clippier Gap, Nos. 1 & 2.....	22 00 @ 23 00
Gray Lane White.....	22 50 @
Shotts, No. 1.....	23 00 @
COPPER—	
Polt.....	20 @
Shanahy.....	18 @
Ingot.....	12 @ 13
Fire B & Sheets.....	— @ 20
LEAD—Pig.....	4 75 @ 5 00
Bar.....	5 00 @ 5 50
Sheet.....	5 00 @
Shot, discount 10% on 500 bag Drop, 3 bag.....	1 65 @
Butt, 3 bag.....	1 85 @
Chilled, do.....	2 05 @
QUICKSILVER—By the flask.....	50 @
Flasks, new.....	1 05 @
Flasks, old.....	85 @
STEEL—English, lb.....	14 @ 15
Black Diamond, ordinary sizes.....	10 @
Plow.....	4 @ 5
Machinery.....	5 @ 6
Sanderson Bros.....	10 @
ZINC—German.....	8 @ 9
Sheet, 7 1/2 ft, 7 to 10 lb, less the cask.....	— @ 10
TIN PLATE—Coke.....	4 90 @ 4 95
Charcoal.....	6 25 @

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

MINING SHAREHOLDERS' DIRECTORY.

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ASSESSMENTS.								
COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.		
Almont M Co.	Arizona.	1.	05.	Mar 30	May 7.	May 28.	T. Harman.	330 Pine St
Baker Divide M Co.	California.	13.	25.	Mar 19.	Apr 19.	May 9.	D. M. Kent.	330 Pine St
Best & Belcher M Co.	Nevada.	36.	50.	Mar 5.	Apr 15.	May 5.	L. O. O'Brien.	309 Montgomery St
Bodie Tunnel M Co.	California.	14.	25.	Mar 2.	Apr 27.	May 20.	C. C. Harvey.	309 California St
Caledonia M Co.	Nevada.	42.	15.	Mar 1.	Apr 5.	Apr 26.	A. S. Gooch.	414 California St
Comstock M Co.	Nevada.	3.	15.	Mar 14.	Apr 15.	May 15.	A. E. Ball.	309 California St
Con Washoe M Co.	Nevada.	2.	10.	Mar 24.	Apr 25.	May 14.	P. McEwen.	314 Montgomery St
Confidence S M Co.	Nevada.	14.	05.	Apr 7.	May 12.	June 2.	A. S. Groh.	414 California St
Dolores Con M Co.	Nevada.	4.	05.	Mar 2.	Apr 11.	Apr 29.	R. N. Van Brunt.	318 Pine St
Europa M Co.	Nevada.	9.	25.	Apr 5.	May 12.	June 7.	J. Morizio.	328 Montgomery St
Florida M Co.	California.	1.	30.	Mar 16.	Apr 18.	May 7.	T. J. Mitchell.	Grass Valley
Gover Improvement Co.	California.	2.	10.	Feb 28.	Apr 5.	Apr 26.	R. N. Van Brunt.	318 Pine St
Gold & Curry S M Co.	Nevada.	55.	50.	Mar 3.	Apr 11.	May 4.	A. K. Dushow.	309 Montgomery St
Hale & Norcross M Co.	Nevada.	33.	50.	Mar 9.	Apr 14.	May 4.	J. F. Lightner.	339 Montgomery St
Inyo Marble Co.	California.	1.	50.	Mar 15.	Apr 15.	May 9.	O. F. Von Rhein.	424 California St
Lavermore Oil Co.	California.	1.	05.	Mar 8.	Apr 12.	May 2.	H. Deas.	339 Montgomery St
Mayflower C. M. C Co.	California.	25.	25.	Mar 23.	Apr 25.	May 16.	J. Morizio.	328 Montgomery St
Mammoth M Co.	Nevada.	5.	1.00.	Mar 23.	Apr 25.	May 19.	C. Crockett.	327 Pine St
Mono M Co.	California.	23.	50.	Mar 31.	May 5.	June 2.	G. W. Sessions.	309 Montgomery St
Nevado M Co.	Nevada.	17.	25.	Mar 14.	Apr 21.	May 13.	J. W. Pew.	310 Pine St
Nevada Queen M Co.	Nevada.	2.	50.	Mar 10.	Apr 14.	May 6.	H. Deas.	309 Montgomery St
Norte Belle Isle M Co.	Nevada.	27.	50.	Mar 14.	Apr 19.	May 11.	J. C. Elliot.	310 Pine St
Potosi M Co.	California.	27.	30.	Mar 9.	Apr 14.	May 4.	C. E. Elliot.	309 Montgomery St
Richellu M Co.	California.	3.	124.	Mar 9.	Apr 15.	May 12.	G. L. Lang.	4th and Townsend St
Savage M Co.	Nevada.	67.	50.	M. 10.	Apr 12.	May 2.	E. B. Holmes.	309 Montgomery St
Sierra Iron Co.	California.	6.	2.50.	Feb 17.	Mar 30.	Apr 23.	H. P. Bush.	431 California St
Sierra Nevada S M Co.	Nevada.	35.	50.	Mar 14.	Apr 19.	June 8.	E. S. Parker.	319 Montgomery St
Union Con M Co.	Nevada.	35.	25.	Mar 31.	May 6.	May 26.	J. M. Bunting.	309 California St
Utah Con M Co.	Nevada.	1.	20.	Apr 6.	May 9.	May 26.	A. H. Fiso.	309 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Argenta M Co.	California.	E. M. Hall.	314 Montgomery St.	Special.	Apr 19
Russell Reduction M Co.	California.	J. Morizio.	328 Montgomery St.	Annual.	Apr 30
Young America M Co.	California.	P. M. Hall.	314 Montgomery St.	Special.	Apr 19

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50.	Apr 7
Original Hidden Treasure.	Nevada.	D. A. Jennings.	401 California St.	13.	Apr 4
Plymouth Con M Co.	California.	A. H. Clough.	New York.	25.	Apr 4
Pacific Borax, Salt & Soda Co.	California.	A. H. Clough.	431 California St.	10.	Apr 7
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	10.	Apr 15
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	15.	Apr 15

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar. 24.	WEEK ENDING Mar. 31.	WEEK ENDING Apr. 7.	WEEK ENDING Apr. 14.
Alpha.....	3.50	4.50	2.5	4.00
Alta.....	0.05	2.50	1.30	2.00
Andes.....	1.10	1.30	.95	1.15
Argenta.....	.16	.15	.45	.15
Belcher.....	2.90	3.70	2.30	2.85
Brophy.....	.75	.95	1.00	.85
Best & Belcher.....	2.30	2.50	1.95	2.35
Bullion.....	1.00	.75	.80	.75
Baltimore.....	.45	.70	.75	.60
Bodie Isle.....	2.00	2.30	2.00	2.15
Benton.....	.65	.60	.65	.60
Bodie Tunnel.....	1.20	1.25	1.30	1.25
Bulwer.....	.15	.12	.15	.12
Con. Va. & Cal.....	2.50	2.50	2.50	2.50
Challange.....	.57	.57	.50	.57
Champion.....	.57	.57	.50	.57
Chollar.....	10	112.00	9.25	9.00
Confidence.....	2.75	2.85	1.90	2.00
Con. Imperial.....	.45	.40	.45	.35
Caledonia.....	.30	.30	.30	.30
Con. Pacific.....	3.70	4.30	3.50	3.70
Crown Point.....	.60	1.00	.80	.80
Crocker.....	.60	.65	.65	.70
Central.....	1.35	1.40	1.40	1.40
Dudley.....	1.60	1.90	1.25	1.30
East B. & C.....	1.60	1.90	1.25	1.30
Eureka Con.....	1.60	1.90	1.25	1.30
Exchequer.....	.70	.75	.80	.85
Grand Prize.....	4.40	5.50	4.20	4.50
Gold & Curry.....	4.60	5.30	4.40	4.70
Hale & Norcross.....	3.00	3.00	2.75	3.00
Holmes.....	.20	.25	.25	.25
Independence.....	.80	.95	.75	1.00
Iowa.....	.50	.60	.40	.55
Julia.....	1.50	1.80	1.40	1.50
Justice.....	1.50	1.80	1.40	1.50
Kentuck.....	1.50	1.80	1.40	1.50
Lady Wash.....	.45	.50	.32	.45
Martin White.....	.20	.25	.25	.25
Mono.....	2.20	2.50	2.00	2.15
Mexican.....	53	62.50	4.05	4.20
Mt. Diablo.....	4.20	4.25	4.00	4.10
Northern Belle.....	.80	1.00	1.15	1.20
Navajo.....	5.25	7.00	6.25	7.00
Nev. Queen.....	1.70	2.80	2.20	2.30
North G. & C.....	3.50	4.00	3.50	3.75
Occidental.....	.83	1.00	.60	.65
Ophir.....	1.65	2.00	1.60	1.75
Overman.....	.67	8.00	1.30	1.50
Potosi.....	.67	8.00	1.30	1.50
Peerless.....	.45	.65	.55	.60
Peer.....	.35	.10	.75	.05
P. Sheridan.....	.30	.85	.60	.80
Silver Star.....	5.25	7.00	6.25	7.00
Savage.....	1.00	1.00	1.00	1.00
Seg. Belcher.....	.45	.60	.40	.45
Sierra Nevada.....	.35	.45	.30	.35
Silver Hill.....	.30	.85	.60	.80
Silver King.....	.30	.85	.60	.80
Scorpion.....	.30	.85	.60	.80
Syndicate.....	3.20	4.10	3.50	3.75
Union Con.....	1.25	1.55	1.20	.90
Yellow Jacket.....	4.70	5.30	4.75	4.05

Sales at San Francisco Stock Exchange.

THURSDAY APR. 14, 1887.		1125 Iowa.....	1671.10
500 Alta.....	2.25	51 Julia.....	.50c
1125 Andes.....	1.35	410 Justice.....	1.30
100 Atlantic.....	.45c	200 La Pansa.....	1.50
100 Alpha.....	4.00	200 Lady Wash.....	.50c
250 B. & Belcher.....	7.27	270 Mexican.....	4.60
70 Bullion.....	2.25	20 Mt. Diablo.....	4.00
20 Beaton.....	70.75c	1210 Nev. Queen.....	2.30
50 Belcher.....	2.20	65 Ophir.....	8.00
150 Baltimore.....	.55	150 Overman.....	1.45
100 Belle Isle.....	.65c	100 Occidental.....	3.00
400 Chollar.....	.65	300 Potosi.....	7.50
720 Con Va & Cal.....	15.15	300 P. Sheridan.....	.05c
320 Crown Point.....	4.20	700 Peerless.....	.70c
400 Crocker.....	1.00	750 Peer.....	.45c
600 Central.....	.70c	235 Savage.....	6.00
150 Challeco.....	2.20	312 Sierra Nevada.....	3.65
600 Calisto.....	2.20	300 Scorpion.....	.90c
50 Confidence.....	.40	100 Silver Hill.....	.90c
100 Dudley.....	.25c	300 Union Con.....	3.10
520 Exchequer.....	1.65	600 Utah.....	1.15
950 Gold & Curry.....	4.15	200 Weldon.....	2.15
820 Hale & Nor.....	.55	275 Yellow Jacket.....	4.60

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Con. California and Virginia, April 9, \$135,089; Dexter, 8, \$2560; Hanauer, 5, \$3250; Bannock, 5, \$3700; Hanauer, 6, \$1575; Alice, 8, \$11,893; Hanauer, 8, \$3300; Locomotive, 13, \$3700; Hanauer, 9, \$3225; Manhattan, 7, \$18,934. Last week's shipments from Butte, M. T., aggregated \$97,120. The fine bar receipts in Salt Lake City for the week that ended April 8th were to the value of \$51,476.97; base bullion, \$9150; gold bars, \$2250; silver bars, \$17,050.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 262 Market St., S. F.

FOR WEEK ENDING APRIL 5, 1887.

360,504.—ELEVATOR—Henry Albert Crescent City, Cal.	360,571.—SULPHUR SPRINKLER—John Fajio, Santa Clara, Cal.	360,581.—SCREEN BOTTOM FOR FILTERING TANKS—A. Gaukroger, S. F.	360,773.—VAPOR BATH—E. Hosford, Oakland, Cal.	360,707.—CLOD-CRUSHER—D. Lubin, Sacramento, Cal.	360,535.—PIN-RAIL ATTACHMENT FOR VESSELS—J. McKeon, S. F.	360,539.—EXCAVATING MACHINE—E. Remillard, Oakland, Cal.	360,831.—CAR COUPLING—S. Truax, Truax Landing, W. T.	360,832.—CAR COUPLING—S. & E. H. Truax, Truax Landing, W. T.	360,499.—PHOTOGRAPHIC APPARATUS—A. P. Whittell, S. F.	14,230.—TRADEMARK—H. E. Holmes, Walla Walla, W. T.
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DELINQUENT NOTICE.

Gover Improvement Company.—Location of principal place of business, San Francisco, California. Location of works, Amador County, Cal.

NOTICE.—There are delinquent, upon the following described stock, on account of Assessment No. 2, levied on the 24th day of February, 1887, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Am't.
Engene Dutilh.....	3	10	\$100 00
Eugene Dutilh.....	46	5	50 00
J. C. Haselton.....	36	10	100 00
A. Ogden.....	1	10	100 00
A. Ogden.....	45	5	50 00

And in accordance with law, and an order of the Board of Directors, made on the 24th day of February, 1887, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of said Company, on Tuesday, the 26th day of April, 1887, at the hour of 3 o'clock p. m., of said day, to pay said delinquent Assessment thereon, together with costs of advertising and expenses of the sale.

R. N. VAN BRUNT, Secretary.

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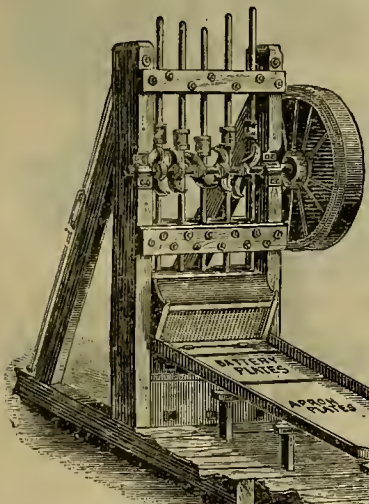
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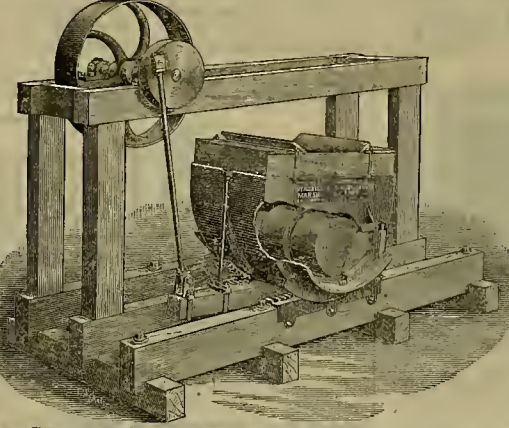
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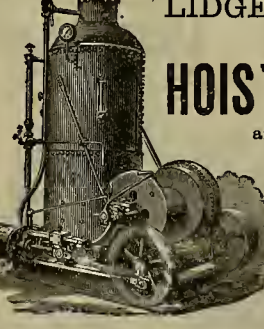
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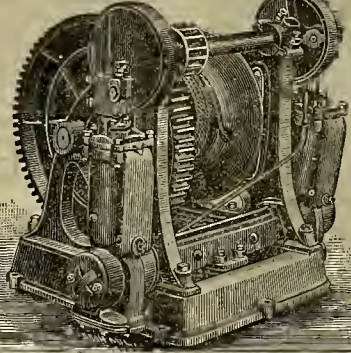
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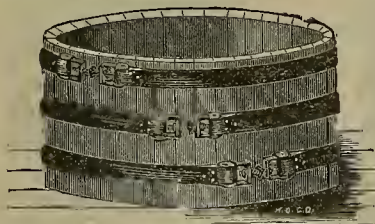
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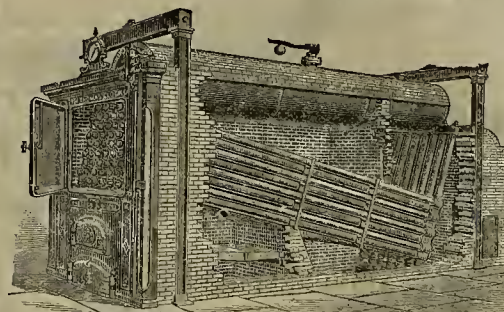
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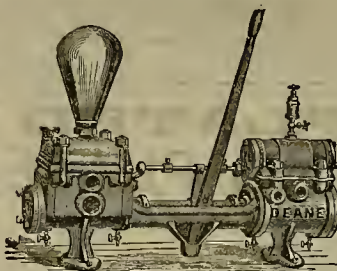
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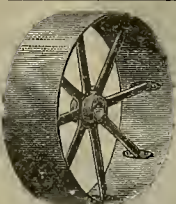
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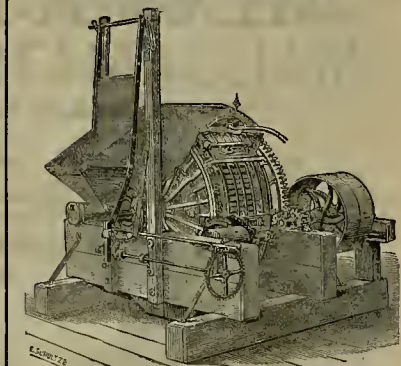
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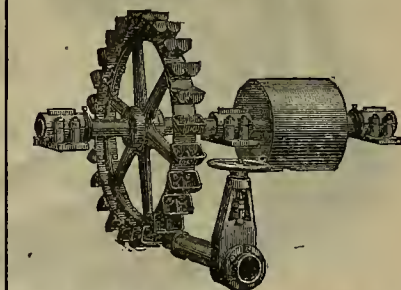
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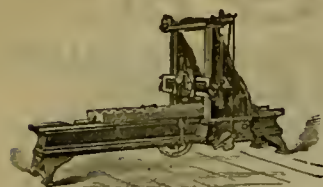
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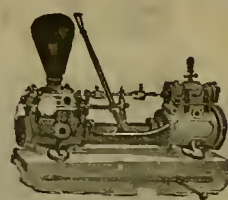


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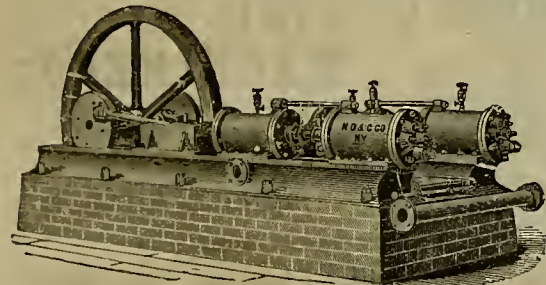
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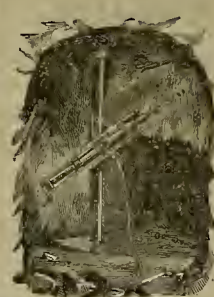
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GUTENBERGER'S ROLLER ORE CRUSHER.

Crush 8 to 10 Tons per Day.

Portable and Durable.

WEIGHT, 4 TONS.

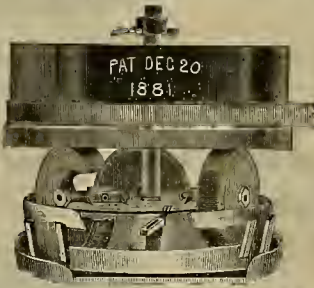
It is a full fledged Quartz Mill without gearing, cone or pulleys.

Power applied direct. Works Ore at Low Cost. More or less weight on Crushers as desired.

Very little friction. Beats other machines in reducing and amalgamating ore, and costs less. All who have used this mill recommend it highly. Splendid for low-grade ore on account of low cost of working.

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Chicago Prices Beaten!

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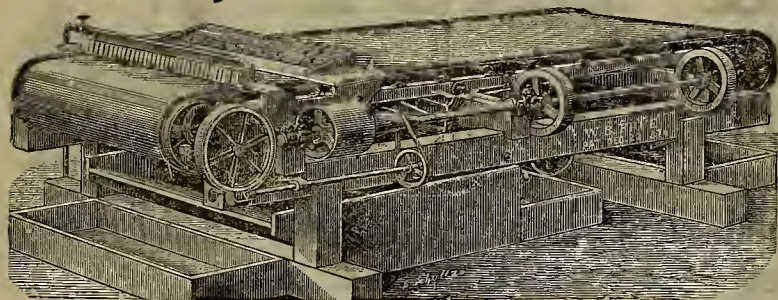
221 & 223 First St., cor. Tehama, S. F.

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Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chases, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Shot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).
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 Elevator 12 Front St. }

\$1,000 CHALLENGE!



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OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS
(\$575.00) F. O. B.**

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

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OF EVERY VARIETY.**

Steam Pumps of all Makes,

CENTRIFUGAL PUMPS,

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BLOWERS AND EXHAUST FANS.

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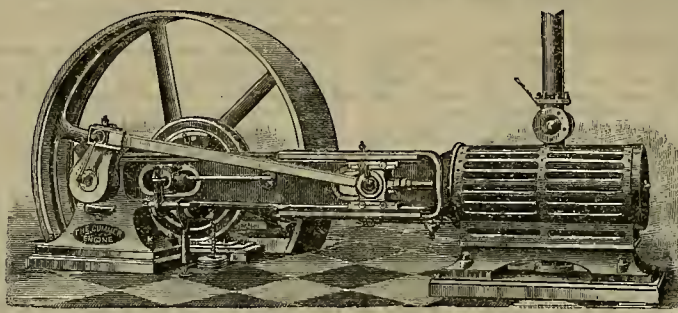
LUBRICATING COMPOUNDS and OILS
OF THE BEST MAKES.

PIPE and PIPE FITTINGS.

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FITTINGS.

Hydraulic Mining, Quartz, and Saw-Mill Machinery, Hydraulic Gravel Elevators, Hydraulic Giants, "Triumph" Ore Concentrators, Automatic Ore Feeders.



SPECIAL AUTOMATIC ENGINES.

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Stationary, Portable, and Hoisting
ENGINES and BOILERS.

Shafting,

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**WOODWORKING
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—COMPRISING—

BAND SAWS, STICKERS,
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Single and Double Circular Saw-Mills.

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"Cummer" Engines, from Cleveland, Ohio,
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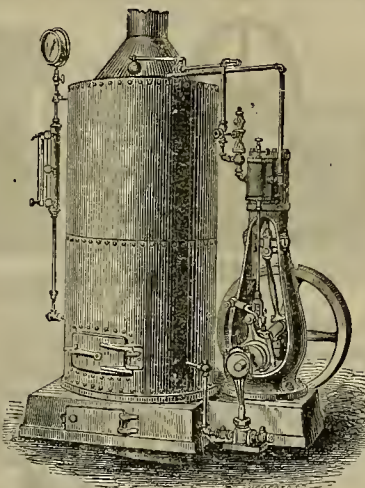
"Wilbraham" Rotary Piston Pumps

"Bogge & Clarke" Centrifugal Pumps.

The Volker & Felthousen Mfg Co.'s

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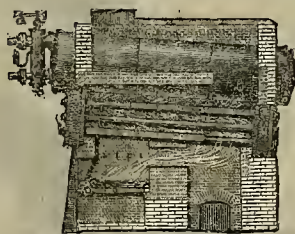
L. R. MEAD, Secretary.

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Location of Works, S. E. Cor. Beale and Howard Sts., San Francisco.

Manufacturers and Sole Agents for the Pacific Coast for

**HEINE SAFETY
WATER TUBE
BOILER.**



Has the Following Advantages:

**SAFETY,
DURABILITY,
ECONOMY,
AND FACILITY OF INSPECTION and REPAIRS.**
60,000 Horse Power now in use.

Boilers can be seen working in San Francisco at Palace Hotel, Spring Valley Water Works, Hueter Bros. & Co., California Jute Mills, and other places.

Guaranteed More Efficient than any other Boiler made.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

AIR COMPRESSORS—Rope Power Transmission.

HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch

pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.

SAW-MILL MACHINERY of all kinds.

STEAM ENGINES—Corliss, Slide-Valve, Ponnet Valve Automatic, Single, and Compound.

SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube);

50,000 horse power now in use.

MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-

iron pulleys, will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

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STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship

Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain

Mining Company.

Send for Circular and Price Lists.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, APRIL 23, 1887.

VOLUME LIV
Number 17.

Nautical Science.

The Chamber of Commerce of this city has petitioned the Regents of the University of California to establish a department in nautical astronomy and practical navigation. This would be another step toward the practical, which seems to be the present tendency in educational matters. To a seahoard region like this it would seem to be a necessity. But this has been one of the neglected studies. A great deal of money is expended on mere theories, and it is but right that something in the practical direction indicated should be done. The proposition was made by Capt. Wm. H. Parker, and it is to the effect that at the university there should be established a Chair of Nautical Science; and that primarily the student should be instructed in elementary and nautical astronomy and the science of navigation, the first objects being to make the student a good, practical and intelligent navigator.

After this success is secured, the idea is to enlarge the subjects taught to some knowledge of shipbuilding, cannon and naval tactics. And this because Congress, in giving the land scrip to the agricultural colleges, especially required them to teach military tactics (the object being to prepare our citizens to defend the soil); and as our next war must inevitably be fought principally on the ocean, it is only right that some of our young men should be educated to constitute what we may call the naval reserve.

The Chair of Nautical Science would not necessarily be confined to those actually preparing to enter the merchant service, but would be open to all. Nautical astronomy is as necessary to a liberal education as is practical astronomy, and there is no reason why one should, in making a voyage, look upon the art of finding the ship's position at sea as a mystic operation, or be unable to understand why the day is changed in going from San Francisco to China. Moreover, it is believed that lectures on naval history, salvage, protests, contracts, rights of search, collisions, law of blockade, etc., would not only interest the general student, but would be absolutely essential to those intending to become admiralty lawyers.

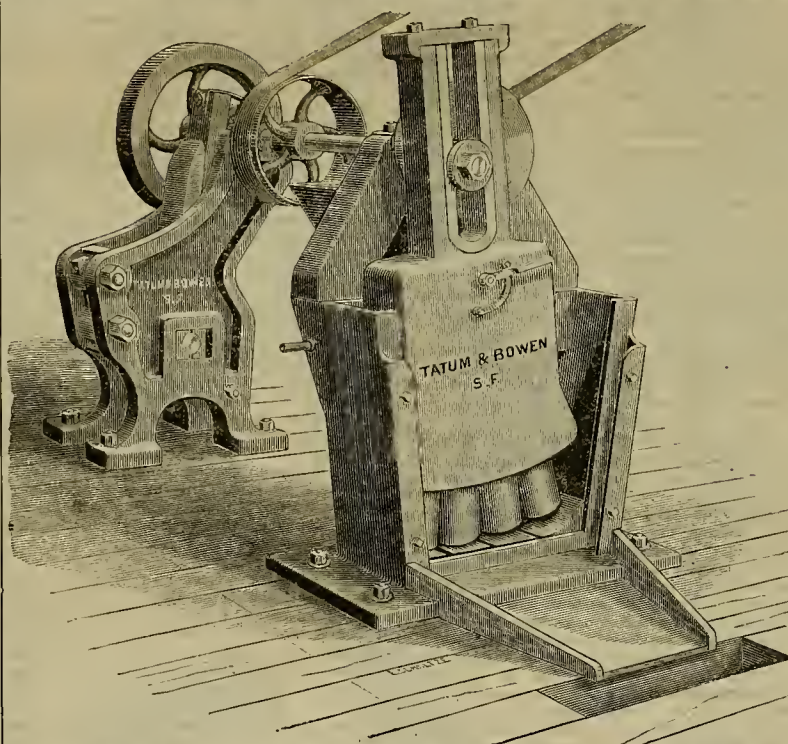
One of the editors of the PRESS some time since suggested to one of the Trustees of the Stanford University to bring this subject to the attention of Senator Stanford, with a view to his establishing a Chair of Nautical Science there, and providing opportunities for constructing and testing models of vessels. It is too soon, however, to look for any action in that quarter. The petition of the Chamber of Commerce will cause the University Regents to look into the subject. The study suggested is a practical one and would benefit many.

THE Lexington mines are located on and about Alamo mountain in Ventura county. The Frazier mines are about a few miles distant, but in Los Angeles county. A spur of the Alamo mountain runs north into the latter county, in which the Cedar mining district is located. There are three quartz-mills in constant operation in the latter district.

THE Cour d'Alone Water & Mining Company has ordered the necessary pipe and hydraulic giants for the purpose of operating the placer ground on the point of Bear gulch, opposite Raven, and will commence operations as soon as the weather will permit.

Electricity and Ores.

We recently mentioned the tests made of Dr. Rae's electric process in the working of ores at the mill of J. M. Douglass & Co., Dayton, Nev. Experiments were at first made on tailings, to see if the mercury contained therein could be put in a condition so as to be collected and saved. When these experiments were successful, tests were made with the pulp in the pans to endeavor to prevent the loss of mercury and amalgam, which their presence in the tailings showed was going on. This was considered to be mainly due to the "flouring" of the mer-



THE ECONOMIC QUARTZ MILL, ROCK BREAKER AND ORE FEEDER.

cury, so common in all mills where pans are used. We gave the details of the results of these tests at the time. They were so successful that a more complete plant was contracted for and put up at the mill, so that long-continued work with the system might thoroughly prove its efficiency.

We received this week a letter from Wm. A. Rulison, superintendent and assayer for J. M. Douglass & Co., Dayton, Nev., in which he says:

"Douglass mill started up on Wednesday, April 13th, and we have gradually increased until now we are running 16 pans (full capacity of mill) and 12 settlers on 135 tons per day. The Rae system is apparently working better than on the test run of 52 tons, made some time ago. We have also applied the electric system to our cleanup pan running on blanket tailings, and the results are beyond our most sanguine expectations, throwing down every particle of 'flour' quick."

PROF. JOSEPH LE CONTE, of the University of California, is announced to address a meeting of the National Academy of Sciences at Washington on the subject of "Some Phenomena of Binocular Vision."

Donations to the Mining Bureau.

The following are among the recent additions to the Museum of the California State Mining Bureau:

Silver ore from Carson Creek mines, Calaveras Co., Cal., by S. L. Burbridge.

Sandstone—A very fine building material; large dressed block and specimen in the rough; Blacklock quarry, Curry Co., Oregon, from the company.

Fossils from Sailor canyon, Placer Co., Cal., J. R. Sanborn.

Volcanic dust from the great eruption of

A Small Quartz-Mill.

Of late there has been so much demand for small ore-crushing plants that inventors and manufacturers have been giving considerable attention to such things. We illustrate on this page the James' patent "Economic" quartz-mill, with rock-breaker and automatic ore-feeder. This appliance was first invented by a practical miner, but it was not until quite recently that it was improved and patented in its present form, so that it is now in reality a new machine presented for the first time to the consideration of miners.

It is simple in construction, composed of few parts—strong and durable—and combines the advantages of the regular stamp-mill and arrastra, both as a crusher and gold-saver, while the price is so low as to place it in the reach of all. There is no part of the Economic mill that can get out of order, and there is no wear except on the shoes and dies. The operation is a reciprocating one, requiring very little power, for gravitation does half the work, the effect being to throw the weight of the shoe-block (1200 pounds) in unison with the force of the reciprocating power alternately and separately on each shoe, thus creating sufficient agitation to expel the pulp as fast as it is reduced, while the gold is returned in the mortar in amalgam. The result is substantially the same as obtained in the regular stamp battery, which is known to be the best gold-saver.

The construction of the mill is such that it admits of a high rate of speed, say from 150 to 175 revolutions per minute of the shaft. This gives from 300 to 350 strokes, and as there are four shoes, from 1200 to 1400 strokes of the shoes per minute are given. The action of the shoes is practically that of the stamp in coming down, but after they strike there is a sliding motion which tends to grind the ore. Running at this high rate of speed, it must be evident that the mill will do a fair amount of work and that the agitation will be ample to expel the pulp.

Messrs. Tatum & Bowen, of this city, the manufacturers, state the capacity at from 6 to 10 tons per 24 hours. They have arranged also to make double or triple mills—that is, two or three rockers are placed in one mortar, which, of course, increases crushing capacity in proportion. The screens are on the two opposite sides of the mortar, on the line of the throw, so there is a double discharge, where two or more rockers are used. The rock-breaker is of a capacity of about 24 tons per day. Mills can be ordered without the rock-breaker, if desired, but, as shown in the cut, the whole makes a complete milling plant. The automatic ore-feeder is not plainly shown in the cut, but it is all that is required to feed the ore automatically. The mill complete weighs 2400 pounds. The rock-breaker weighs 800 pounds. About 4-horse power is required to run both machines. The mortar is 17 inches by 36 inches. Height of mill, 5 feet; length of screen, 24 inches. The prices are given in the advertisement in another column.

SUB-TREASURER BROOKS is at a loss to know what to do with incoming coin. The vaults contain \$22,000,000 in standard dollars, \$28,000,000 in gold and \$7,300,000 in currency.

LIEUT. CHARLES W. DANENHOWER, the Arctic explorer, shot and killed himself at the U. S. Naval Academy on Wednesday last.

Tarawera, New Zealand, June 10, 1886, Mrs. A. E. Bush.

Fossils from the Tassajara valley, Contra Costa Co., Cal., G. W. Martin.

Eggs and horns of the horned shark, San Pedro, Cal., Benj. Hill.

Rich silver and copper ores (Peacock copper), from New Mexico, Chas. Kaufman.

Stream tin concentrations from Dakota, Melville Attwood.

Silicified Wood—Large specimen of the root of a tree or hush, Sonoma Co., Cal., W. L. Watts.

Gold Quartz—El Dorado Co., Cal., T. Davidson.

Silver Ore—Tepetste mine, Mexico, E. Wolleb.

Silver Ore—Very rich; Jesus Maria mine, Mexico, M. A. Wheeler.

Lower jaw and teeth of mastodon, Mexico, fine specimen, J. Z. Davis.

THE Port Townsend Argus says there were 43 lumber cargoes carried away from Puget sound during March, aggregating 27,249,043 feet and valued at \$379,202. The increase in coal and lumber shipments is large and gratifying.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Ems.

Fracture of Glass Tubes.

EDITORS PRESS:—In the *Scientific American* of the 9th of April attention is called to the fracture of a glass water gauge on the boiler of a locomotive; and as the subject was referred to in the MINING AND SCIENTIFIC PRESS of December 13, 1884, in a communication entitled "Fracture of Glass Tubes," the cause of such fractures seems to remain open for discussion, or, what is much better, it invites discovery. The regularity with which water gauges are broken, when a No. 16 brass wire is pushed in and withdrawn from the tube, demonstrates the existence of a law; this law may be as old as creation and as wide as the universe.

The time intervening between the contact of the wire with the inside of glass tube and the resultant fracture of the tube varies from 5 minutes to 12 hours; but in all of my experiments no tube failed to break, and there was a suggestive similarity in the curvilinear lines of fracture.

The cut represented in the *Scientific American* has spiral lines of such mathematical exactness as to excite doubts as to its being absolutely correct. But the tendency to break in curved lines is marked in my experiments.

My theory now is, that the latent molecules of electricity in the glass tubes may be polarized or set in action, by which each atom might exert force in changing its poles; and if this were done, the rigid, brittle nature of glass would break on lines of greatest force or least cohesion, when metal would only expand according to recognized and demonstrated laws. (See Tyndall's "Notes on Electricity," p. 137.)

Prof. Davidson tried an experiment with copper wire on two glass tubes. In each case the tube was cracked in 24 hours, and although the character of the cracks may be a remarkable coincidence, yet each tube had a circular crack at the ends, with a longitudinal crack connecting the rings.

In Colorado, the fractures (when brass wire was used) might follow in five minutes, and seldom exceeded five hours; and the separation of the glass immediately followed the lines of cracks which quickly ran through the tube when the fracture commenced.

In San Francisco and vicinity, the fracture is similar, but seems to occur much later than in Colorado.

If the fracture of glass tubes, under these conditions, be regarded simply as an empirical fact, even then the experiment is interesting, and a careful investigation may lead to important results. The brass wire which was used with greatest effect in my experiments was shaped like a helix, and enough wire unwound to pass through the tube.

EDWARD E. CHEVER.

From Nogales, Arizona.

EDITORS PRESS:—The usual February rain was omitted this year, and the agricultural, mining and stock interests of Arizona and Sonora began to suffer. A couple of days ago we had a little rain—not enough to do much good. Now it is snowing. March was so warm that stoves were discarded and extra quilts relegated to their summer depositories. We all thought summer had set in, though somewhat early. The weather changes here from hot to cold and the reverse, with great suddenness and frequency, in spring and fall.

The building of small honeys still continues, though general business is only fair to middling. There is considerable activity in Sonora mines and prospects, denunciations being made at the rate of ten per day in Magdalena district. The Nogales smelter stopped some time ago for want of ore, and though there is now a pretty good stock on hand, it will probably not blow in for some weeks yet. The company has been buying silver ore on a falling market, and is, perhaps, in no hurry to realize. The fall in silver is bad for the retail trade here, as that is all done in Mexican coin, which sympathizes with the rise and fall of bullion.

An effort has been made by the residents to cleanse the village, and considerable benefit has resulted. There is also a movement toward incorporation, but serious doubts are entertained by many as to whether an incorporation would have any better effect than to saddle the community with the maintenance of a gang of political bummers and papsuckers and a heavy debt.

The recent border trouble has led to the encampment of a company of U. S. infantry a mile from town, where, in case of another disturbance, they would be of little use, as the half hour or so which would elapse before they could be summoned to the scene would probably be about all the rioters would require. But it seems that the discipline of the U. S. army is not such as to admit of the quartering of a garrison or guard within a mile of a whisky-shop.

Rohrbies have been rather frequent of late, and there are a good many cases of smallpox on both sides of the line, though but few have, thus far, been fatal. The want of municipal power on this side, and of proper laws (or the

enforcement of such) on the Mexican side, make it impossible to control an infectious disease by the isolation of patients. Fortunately, the natural salubrity of the place operates to prevent epidemics; moreover, not all of the cases reported as smallpox prove to be such, for if a person exhibits any kind of cutaneous eruption, he or she is held to be guilty until innocence is proved, and must move out or the residence is *flagged*. Our doctors don't seem to be very expert at diagnosing smallpox, as they have declared several persons affected who were no more so than the writer is now.

On the whole, Nogales is slightly progressive, and there are worse, as well as better, places in the world. X.

Nogales, April 12, 1887.

Mercury.

[Translated for the Press.]

There are only four localities where mercury or quicksilver is found in abundance. These are California, Austria, Almaden in Spain, and Peru. The mines in this latter place were discovered in a very curious manner. Cinnabar, the soft and reddish rock of which mercury forms a part, when ground very fine serves as a beautiful red paint.

The Indians used this to adorn their bodies. This caused the country where they were living to be examined for cinnabar. The Romans had used it for hundreds of years in the decoration of their images. It is of great value now, in our times, and we call it vermilion. The other part of the rock is composed partly of sulphur. The cinnabar is crushed and exposed to heat. In the meantime, mercury in the form of vapor passes into a vessel framed for the purpose, where it cools. After being reduced to this liquid state it is pure and is in condition to use.

In this form it is used largely to separate the metals from the rock to which they adhere.

The rock having been well crushed, the material is passed through a screen and is washed to obtain all the gold and silver possible. Quicksilver is then placed in it, which appears to be absorbed at once, and as it takes up or moves with the metal in the ore, this metal is separated from the sand or crushed rock. If gold is the metal that is to be amalgamated, a yellowish-white amalgam will be found. This is heated in retorts and the mercury or quicksilver disappears, leaving the gold. Although mercury is so useful in many ways, it is also poisonous, its vapor being dangerous to inhale. It is not many years since the mines of Austria took fire, poisoning 1300 laborers, many of whom eventually died. Even the water used to extinguish the flames, and which passed into a river a short distance from the mines, killed the fish.

The mercury is transported in some countries in sacks made of dressed sheepskins, but is mainly carried in cast-iron flasks.—*From El Minero Mexicana.*

CRYSTALLINE STRUCTURE OF IRON METEORITES.—From an exhaustive study of the very large collection of meteorites at Harvard College, Mr. O. W. Huntington concludes that many of the masses of meteoric iron now known are cleavage crystals, broken off probably by the impact of the mass against the atmosphere. These masses show cleavages parallel to the planes of all the three fundamental forms of the isometric or regular system. The Widmanstätten figures and Neumann lines are sections of planes of crystalline growth parallel to the same three fundamental forms of the isometric system. On different sections of meteorites, Widmanstätten figures and Neumann lines can be exhibited in every degree, with no break where a natural line of division can be drawn. The features of the Widmanstätten figures are due to the elimination of incompatible material during the process of crystallization. The results of this investigation confirm the theory that the process of crystallization must have been very slow. The most probable theory of the origin of meteorites seems to be that these masses were thrown off from a sun among the fixed stars, and that they were slowly cooled while revolving in a zone of intense heat.

STATIONARY ENGINEERS.—The Stationary Engineers' Association, which meets at Huddy's hall, has received applications for leave to organize branches at Hollister and San Diego. The secretary was instructed to enter into correspondence with that object in view. With the organization of these branches the engineers will have five associations in the State, the parent being in this city, and two branches at Sacramento and Eureka. The method of initiation is rather a novel one, unlike that of any similar organization. The applicant is required before acceptance as a member to give practical proof of his competency in open meeting by putting into shape the dismantled pieces of a horizontal slide-valve engine which is brought into the assembly-room. Besides this practical test, which is always insisted upon, the member must also answer questions as to his theoretical knowledge.

A STEAM WAGON that runs on ordinary roads and hauls 30,000 pounds is making successful trips between Bisbee and Fairbank, Arizona. The distance is 60 miles and the trips are made wholly by daylight. The wagon is owned by the Copper Queen Mining Company.

Mining Parlance.

It is surprising to see what ignorance is displayed every day by the so-called "mining men," not particularly of this camp, but generally speaking throughout the entire West, in their lack of knowledge of the rudiments of mineralogy. It is as essential that a mining superintendent should know what kind of formation he is working in, and what minerals are in his ores, as it is for a carpenter to know what kind of wood he is finishing a room with. Not long ago we overheard a prominent mining man asking a friend of his, "what kind of iron ore is manganese?" His friend being a much younger man, and realizing the position occupied by the questioner, answered rather reluctantly "that iron was one element and manganese another," and "that there would be just as much sense in asking what kind of silver ore is gold." Persons charitably disposed might say that "this is only one instance out of a hundred." Yes, that may be; but when you see a man, in whom you have all the confidence in the world, look at a piece of clay and give you as his opinion that "it is a fine specimen of decomposed chloride of silver," it rather opens your eyes, to draw it mild.

And again, when an ex-dry-goods clerk, but now a mining superintendent, speaks of a kind of ore as containing the "chloride of carbonates," you feel like presenting him with a "Dana," or better still, wishing him back to where he belongs—in a dry-goods store.

The conclusion of all this is, that the directors of mining corporations evidently think that any one can superintend the sinking of a hole in the ground, and they send Tom, Dick or Harry out to do it, whether he be a bookkeeper, dry-goods clerk or a general "Jack-of-all-trades." And it will so continue until the corporations realize the enormity of the duties of a superintendent. We have not the space to enumerate them all, but we think it quite essential that he should be at least familiar with the material in which he works, for in the misusage of mineralogical and mining parlance he not only sets himself at ridicule, but also the company which he represents.—*Tombstone Democrat.*

NYE COUNTY MINES.—The Belmont (Nev.) *Courier* says: The outlook for a revival of mining in Nye county is extremely encouraging. Ophir continues to give forth a steady stream of bullion; the new Cincinnati Company of Union district is adding its quota to the silver product; the Barcelona mine at Spanish Belt continues to yield rich ore which is shipped to Salt Lake for reduction; in Philadelphia district the Belmont mine is producing high-grade ore, and so also is Latty's mine; the mines of Tybo are looking well, and are now in shape to produce large quantities of good-milling ore, and the mill will be ready to drop stamps about the 1st of May; the chloridizers in the Ione mines are extracting fine ore, and J. B. Massey and A. Lsbeau are shipping rich ore from Lodi. Nye's mines will be extensively worked this year, and work will be resumed on mines that have long lain idle, early this summer. The mineral here in vast quantities and patiently awaiting capital and enterprise to extract it and turn it into bullion. Mining will always pay in Nye when the work is prosecuted in a legitimate manner.

THE GREAT FLUME AT SAN DIEGO.—It can now positively be stated that the flume company has succeeded in placing \$600,000 worth of bonds, and the great work of bringing mountain water from the headwaters of the San Diego river to San Diego, a distance of 36 miles, will be pushed to completion. The last \$10,000 worth of bonds has been taken by the College Hill Land Association, which owns 1200 acres of land on the mesa near the city, for a college site, and which by this means secures a water supply. The contract for grading the flume line has been let and the contract for building the flume has been taken by Moore & Co., of San Francisco, who have contracted for the 7,000,000 feet of lumber required for the flume. The placing of bonds removes the last obstacle to the completion of this great enterprise, upon which \$150,000 has already been expended to insure an abundant supply of pure mountain water for domestic and irrigation purposes.

A CALIFORNIA MARBLE QUARRY.—It is said that on the banks of the South Yuba, about four miles from this city, there is a deposit of granulated limestone or marble. We have heard of it before, and once, while on a prospecting trip, we saw the alleged marble quarry but we did not examine it closely, as we were then skeptical on the subject of the existence of limestone in that section. We understand that during the past winter the owners of the mining claim upon which the alleged marble is found quarried out some of the rock, and they pronounce it a first-class article. We cannot vouch for the correctness of their judgment. We have seen close formations that, on the surface, very closely resembled limestone, and in the absence of proper tests might pass for such. We shall investigate the matter at our earliest opportunity, and report. If there is a marble quarry there, it might be utilized.—*Nevada City Herald.*

STEPHEN RICKARD, M. E., who has been for some time at Mezquital del Oro, Mexico, has gone to Denver, Col.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SULPHUR SPRINKLER.—John Fatjo, Santa Clara. No. 360,571. Dated April 5, 1887.

This invention relates to a device for sprinkling sulphur upon vines, so as to protect them from the ravages of insects and parasites. It consists of a double conical vessel, the smaller portion of which is centrally located, one end being beveled and provided with a gauze or screen sprinkler, and the other end having a screw-cap through which the material may be introduced.

SCREEN BOTTOM FOR CHARCOAL WASHING AND FILTERING TANKS.—Albert Gaukröger, S. F. No. 360,581. Dated April 5, 1887. This relates to a screen bottom to be used in connection with the tanks in which the charcoal used for purifying purposes in sugar-houses and elsewhere is washed and filtered. It consists of a suitably shaped casing, having fine perforated or other screen material upon its upper and lower surfaces, and in combination with this a filling of coarse sand or fine gravel introduced into the bottom of the screen and between these surfaces.

PIN-RAIL ATTACHMENT FOR VESSELS.—John McKeown, S. F. No. 360,535. Dated April 5, 1887. This invention relates to that class of attachments for vessels which are used for guiding the lower end of the tackle known as the "burton," which is used in unloading; and the invention consists in cylinders or drums above and below the pin-rail, and secured thereto by means of a bolt passing through them and through the intervening pin-rail. The invention consists further in the peculiar construction of these drums or cylinders and the means for fastening them in place. It is the object of the invention to provide a bearing surface upon which the end of the "hurton" is guided and slips, of such a character as to reduce the friction and thereby save the rope.

ELEVATOR.—Henry Albert, Crescent City. No. 360,604. Dated April 5, 1887. This safety appliance for elevators may be briefly described as follows: In each side of the top of the cage is pivoted a weighted balanced catch, the outer end of which comes in contact with, and, under ordinary speed, slips by the successive bars or stops of the rack in the elevator well or shaft. When the cage attains an undue speed in its descent the contact of the catches becomes so severe as to throw them beyond their centers of gravity, causing them to make a complete half-turn, in which position their reversed ends, the one resting on the rack-bar or stop and the other on a fixed stop on the cage or car, effectually arrest the descent of the cage. In connection with these balanced swinging-catches there are several other features of importance. There is also a further feature—namely, the sliding spring-controlled or cushioned cross-head or bar by which the reversible catches, the fixed stops, and the balanced stops are carried, whereby the jar occasioned by the sudden arrest of the cage is wholly obviated and relieved.

PHOTOGRAPHIC APPARATUS.—A. P. Whittell, S. F. No. 360,499. Dated April 5, 1887. This invention relates to improvements in the apparatus for taking photographs, by which each sensitized plate has its portable folding camera attached, and the use of lenses for focusing the picture is obviated. The objects of these improvements are to make each sensitized plate a complete camera without adding greatly to the weight or bulk of the plate, and which will be ready for immediate use at all times and places; also, to lessen the cost of portable photographic apparatus for popular use, and facilitate their manipulation by the amateur and inexperienced, who may by their use always obtain a good image, as no focusing of the apparatus is required. These objects are attained by the following means. In a light tight folding box, made of paper or other suitable material, a diffraction image is produced upon a sensitized plate by admitting the light, which is reflected from the object to be photographed, through a minute aperture in the apparatus, placed at a suitable distance from and opposite to the surface of the plate, the size of the picture being varied by the distance at which the sensitized plate is from the aperture, relatively to the distance of the aperture from the object being photographed, the image, under the varying circumstances, remaining always clear and well defined.

EXECUTION BY ELECTRICITY.—The last Legislature of New York appointed a committee to examine into the most expedient method of inflicting the death penalty in cases of murder in the first degree, and to report on the subject to the present Legislature, whether by gall or otherwise. It is stated that the committee agreed to recommend the abandonment of hanging and the substitution of an electric method.

C. X. HOBBS, well known in this State, and latterly a superintendent of mines in South Africa, was killed there a few weeks since by Jeff McClelland, formerly of the Comstock, but now superintendent of the Filgrim creek mines, Tranevaal. The men had quarreled.

An Upland Loco-Weed.

In the PRESS of Nov. 6, 1886, we gave an engraving and description of a loco-weed occurring in Colorado and New Mexico, botanically known as *Astragalus mollissimus*. Upon this page may be seen another loco plant more common than the preceding and found in abundance on the high plains and in the mountain ranges from British America to Mexico. Its botanical name is *Oxytropis Lambertii*. Although the titles are apparently quite different, the plants are really closely related. Dr. Aea Gray, writing of the two plants named in the *American Agriculturist* some years ago, said:

All the plants sent for identification and said to cause loco poisoning have been of the Leguminosae and of the *Astragalus* tribe. The species to which this damage is attributed in the plains of Colorado proves to be the *Astragalus mollissimus* of Torrey—a very downy species, as its name indicates. We never found this species on the mountains. But there the same ill effects are charged upon plants of similar appearance, belonging to a nearly related genus, *Oxytropis* mainly to *O. Lambertii*, which abounds at all elevations up to 8000 or 9000 feet. The botanical difference between these plants is so little that they might all be counted as species of *Astragalus*, but there is reason to think that this particular *Astragalus* of the plains of Southern Colorado is much the most dangerous. For this species is not found as far north as Wyoming and Nebraska, where the *Oxytropis* abounds on the plains; and there we never heard of this trouble.

These plants are all of the legumes or pea family, and the fact of their injurious character gave Dr. Gray occasion to write this very interesting history of the pea family:

There was a prevalent notion that plants of the pea tribe (*Papilionaceae* plants) generally are innocent, if not wholesome. No one suspected a tribe which gave us peas, beans, lentils and the ubiquitous peanut, and supplies such fodder as clover, medick, lucern, vetch and cow-pea. In the first edition of his "Natural System," Lindley wrote: "The general character of this tribe is its nutritious, or, at least, wholesome, properties." Later, the note is changed, and in the "Vegetable Kingdom" he declares of the order "that, upon the whole, it must be considered poisonous, and that those species which are used for food by man or animals are exceptions to the general rule, the deleterious juices not being in such instances sufficiently concentrated to prove injurious." What a pity that our cattle are not better acquainted with the corrected rule! In Europe and in the Atlantic States no harm is known to come to cattle from want of proper discrimination. But when European flocks were taken to Australia, and to pasture and forage almost wholly new, thousands of sheep perished in the Swan River colony in consequence of cropping the leaves of some leguminous plants to which they were attracted. What made the matter worse for the botanists was that the very plants which did the mischief had been recommended by one of them (Mr. Preiss, a German) as the best thing the agricultural society could cultivate as artificial food for stock. But another botanist, Drummond, a canny Scotchman, got up some experiments and proved that the people were right in charging the damage to these very species (of *Gastrolobium*) which the German botanists on general principles expected to be innocent and useful. The same plants are fatal to goats and even to cows and horses. The symptoms, as described, are almost exactly like those produced by the loco-weed. In other parts of Australia, species of a different genus (*Swainsonia*), very like *Astragalus*, and like the bladder senna (*Crotalaria*), destroy cattle in the same way.

It is recorded that the poison plants of Australia were found on analysis to contain a poisonous alkaloid, apparently *Cytisin*, to which the injurious properties are attributed. It was thought chemical analysis might show something similar in our loco plants, but so far the analyses made do not disclose it. The plant shown in the engraving, *Oxytropis Lambertii*, grows in strongly rooted clumps, has an erect habit. The leaflets are about one inch long by one-fourth to one-third inch wide, and are hairy, especially upon the upper surface. The flower stalks (says Dr. George Vasey in his description) proceed from the root stock and are usually 9 to 12 inches long, and naked except near the top, which has a rather close and thick cluster of flowers, much like those of the *Astragalus* in general appearance, but differing in some minute characters which separate it into another genus, and are succeeded by erect lance-oblong, pointed pods of about an inch in length. The flowers are subject to much variation in color, some varieties being purple, some yellow and others white.

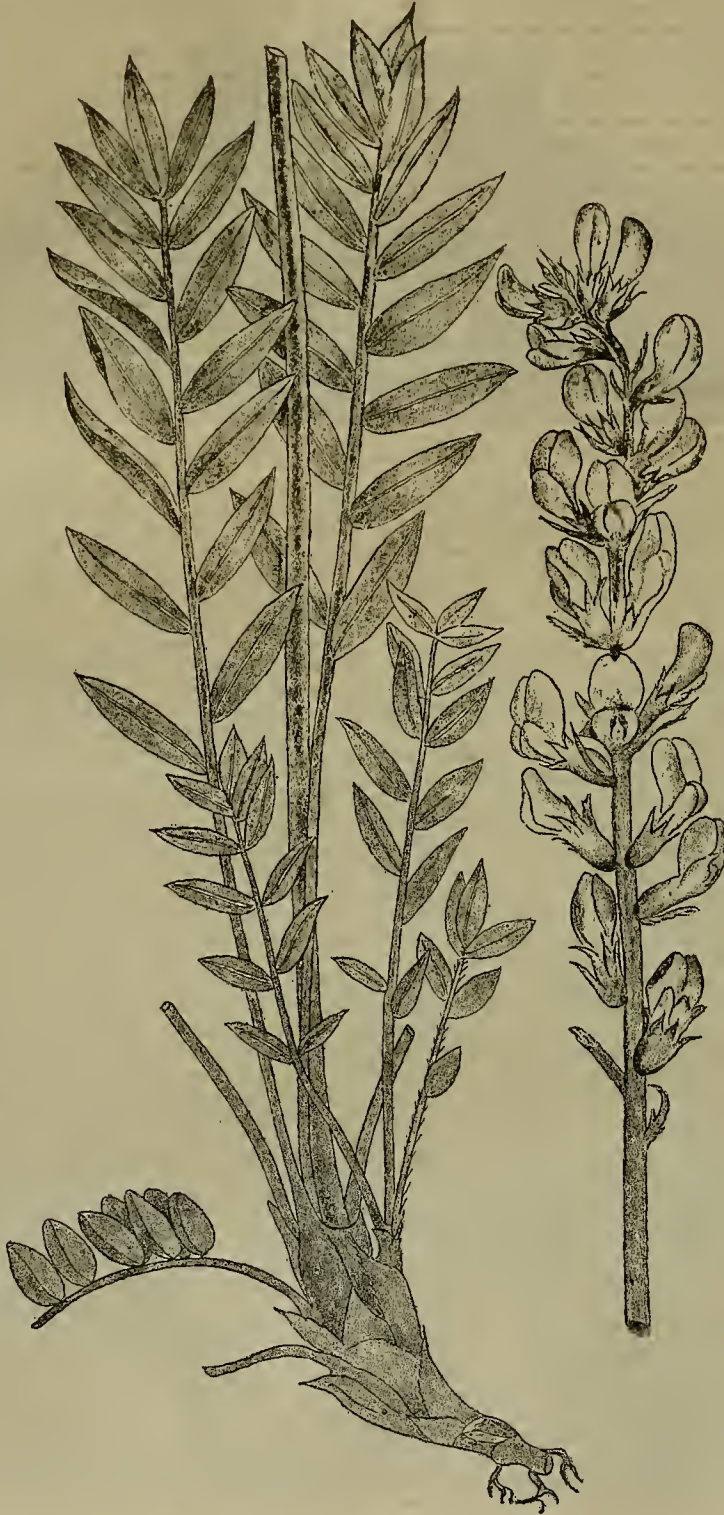
WHITEFISH EGGS.—J. D. Redding, special agent of the United States Fish Commission has received a letter from Charles R. Buckland, agent of the New Zealand Government in this city, that the 10,000 whitefish eggs sent from here had crossed the equator in excellent condition, and that it was the most successful shipment ever sent to the colony. This is the first successful attempt in crossing the equator with fish-ova after transportation by land for a long distance. The shipment was originally from Western New York and New England waters, and the eggs were repacked here at the suggestion of Mr. Redding by James A. Richardson.

Copper Mining at Spenceville.

About seven months ago, believing the ore body to be exhausted and for other reasons, underground work at the Spenceville copper mine was suspended and the men sent to the company's copper mine at Campo Seco, Calaveras county. But a difficulty has been presented in the fact that the ore from this mine does not yield satisfactorily under the process used at Spenceville—burning and leaching and then precipitating the solution. Experiments are now being made to the end that a satisfactory and remunerative result may be secured. Pending the result of those experiments, the

Campo Seco ore is found, underground operations at Spenceville will not be resumed, but the water will be "forked" every year and the solution precipitated. This would require the services of but two men. If, on the contrary, a remunerative process for working Seco ore is not obtained, then the Spenceville mine will be further prospected in the hope of finding the rich body of ore which is thought to exist in the vicinity and from which the water obtains its solution.

When underground operations were stopped at Spenceville, there were many thousand tons of ore on the different dumps. Five or six men have been at work right along attending to the burning, leaching and precipitation of the same. A yield of about \$5000 per month has been ob-

A LOCO PLANT—*Oxytropis Lambertii*.

men have been sent back to Sweetland and orders given to pump out the mine and prospect for a new ore body.

The work of "forking" the water commenced about six weeks since. A pump is not used, the water being hoisted out of the mine in a large automatically acting tub, holding 200 gallons. The water was seen to be very green, showing the presence of copper in solution. It was determined to run this water through the boxes, which are filled with scrap iron, thereby causing precipitation—separating the water from the copper. This was and is now being done and it was found that from every 1000 gallons of water $7\frac{1}{2}$ pounds of copper cement, worth about $7\frac{1}{2}$ cents a pound, is obtained. The water is being taken out at the rate of 1000 gallons every five minutes, so it may be seen that quite a large amount of the copper cement is obtained every 24 hours.

If a satisfactory process for working the

tained thereby, and it will require some three months more to treat the remaining ore.—*Grass Valley Tidings*.

MATTERS in Bodie district are very quiet. Arrangements are about completed for increasing the capacity in the pumping machinery at the Lent shaft, so as to free the lower levels of Bodie Consolidated and Mono of water and do some deep prospecting.

The payrolls of the Comstock mines and mills for March aggregated \$203,838, a material falling off from February, caused by the shutting down of several mines and mills. It is thought the April payroll will reach \$250,000.

The introduction of water-power into the Grass Valley district for the purpose of operating the machinery of the quartz mines is working a revolution in favor of that industry.

Yield of the Comstock Mines in 1886.

There is a tax on the bullion product of the Nevada mines. Quarterly returns of ores raised and milled by the various corporations have to be made to the assessor in each county for that purpose. The Comstock lode is in Storey county. There are scores of mines on that lode, and developments are constantly going on in many of them. Not over half a dozen, however, have anything to report to the assessor for taxation. For the last quarter of 1886 these returns were as follows:

	Tons.	Average.	Bullion.
Belcher.....	10,750	\$8 33	\$89,420
Crown Point.....	10,838	9 31	101,434
Con. Cal. & Virginia.....	31,653	25 45	805,535
Kentuck.....	3,238	12 70	41,141
Savage.....	169	11 40	1,824
Yellow Jacket.....	16,505	10 04	165,724
Totals.....	72,692	\$16 57	\$1,205,082

For the same quarter in 1885, says the *Bulletin*, the same mines, with the substitution of Lady Bryan (196 tons) in place of Savage, reported a gross product of 60,471 tons ore raised, valued at \$749,897, showing an average of \$12.40 per ton. The comparison shows an increase of over 12,000 tons raised and nearly \$500,000 more bullion produced. The best average for the last quarter of 1885 was \$15.20 for the 21,150 tons from the Consolidated California and Virginia mine. In the last quarter of 1886, this mine produced 50 per cent more ore, which showed an increase of \$10.25 per ton average. This is certainly encouraging to those who have been toiling against adverse circumstances for so many years.

The quarterly output of the above mines for 1886 was as follows:

Quarter ending	Tons.	Average.	Bullion.
March 31.....	68,288	\$12 00	\$816,465
June 30.....	76,703	10 40	793,194
September 30.....	51,103	11 95	610,785
December 31.....	72,692	16 57	1,205,082
Totals.....	268,786	\$12 77	\$3,430,526

The mines contributing to the above result were as follows:

	Tons.	Average.	Bullion.
Belcher.....	37,221	\$10 17	\$379,507
Crown Point.....	37,973	11 03	417,370
Con. Cal. and Virginia.....	119,708	14 40	1,768,290
Kentuck.....	12,467	13 63	170,481
Overman.....	1,740	10 32	17,955
Savage.....	2,162	21 17	45,788
Yellow Jacket.....	57,410	10 00	574,100
Totals.....	268,786	\$12 77	\$3,430,526

Substantially the same mines in 1885 produced 228,004 tons ore and \$2,895,249 in bullion, showing an average of \$12.70. The best average for that year was \$14.63 for 59,500 tons from the Con. California and Virginia mine. The Comstock mines did better last year than they have for a long time. Some six or seven months ago, the Con. California and Virginia mine began to show an increased yield of higher grade ore, and during the last six fiscal months the superintendent has sent to the office bullion to the value of \$1,933,602, of which \$765,698 was in gold and \$1,167,904 in silver. The value of the silver is given on the old and artificial basis of \$1.29 per ounce, whereas its gold value has not averaged much over \$1 per ounce. In 1883 the product of 11 Comstock mines was \$1,875,547 from 124,599 tons ore, showing an average of about \$15 per ton. Reduced cost of crushing and increased ore output has enabled the California mine to pay four dividends in the past four months, amounting to \$432,000.

Silver Coinage in March.

The coinage of standard dollars in March amounted to \$3,020,380. This is the largest amount yet turned out for any single month since the resumption of coinage in March, 1878. The amount is nearly one-half as large as the total silver dollar coinage in the first 80 years of the history of this coinage. Last October \$3,000,000 was coined, but that was the first month the amount had gone up to that figure. The law requires that not less than \$2,000,000 nor more than \$4,000,000 shall be expended monthly for silver bullion for silver dollar coinage. The utmost limit has never been reached. The aim of the department has been to keep as near the minimum as possible. The law authorizing the redemption of trade dollars provides that they shall be converted into standard dollars independent of the law of 1878. We may, therefore, look for an increase in the silver coinage for some months. The amount of standard dollars in Government vaults now exceeds \$200,000,000 for the first time. There is now more silver coin than gold coin under the control of the Government. The amount of standard dollars made from March 1, 1878, to March 31, 1887, is \$258,545,977. This amount is disposed of as follows:

In circulation as coin.....	\$ 56,873,605
In circulation by certificate.....	131,930,489
Total in circulation.....	\$188,804,094
Idle in U. S. Treasury.....	69,741,883
Total coinage.....	\$258,545,977
The amount of idle dollars was decreased	\$6,600,000 in March.

THE destruction of the Nevada Queen hoisting works by a powder explosion will be a sad blow to the business interests of Tuscarora, Nev., for a few months.

CHINESE are swarming into the placer diggings near Unionville, Humboldt county, Nev.



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A. T. DEWEY. W. B. EWER. G. H. CROOK.

SAN FRANCISCO:

Saturday Morning, April 23, 1887.

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Passing Events.

Work will soon be commenced on the water-mill on the Comstock, and this is expected to bring brisk times in that region. The use of water-power for quartz-mills is coming into practice in many places on this coast, and wherever the system has been introduced economy in crushing ore has resulted.

Some of the Southern California mining camps are attracting greater attention just now, notably the Piru or Lexington, the Cargo Muchacho and the Julian districts.

California manufacturers are expecting much better times from the workings of the Interstate Commerce Act, though the representatives of certain interests are much opposed to the operations of the new law.

In this State the prospectors are again abroad, and in colder regions they will shortly come out of their winter quarters for summer's work.

Immigrants continue to come into California by the hundreds weekly. They are settling the State up rapidly. Lands to the south having greatly risen in value, many are now searching out the cheaper lands in the upper part of the State.

The resident miners of Gold Hill are again at work.

Finding Mines and Making Mines.

There appears in a recent issue of the New York *Financial and Mining Record* an editorial to the effect that "Mines are Made, not Found." In support of this position we are reminded how much skill, time and money are required to open, equip and bring a mine into a productive condition, and without the application of which it would not only be non-productive, but would have no existence. Now, while the above doctrine is in no case more than partially true, there are some in which it is wholly untenable, there being instances in which mines may be said to be found, and not made. As examples of this kind we have the earliest deposits discovered and worked on the Comstock lode; first at Gold Hill and a little later on the Ophir and the Mexican grounds at Virginia City, at both which localities the rich ore occurred on the very surface, at Gold Hill in croppings that stood many feet above the ground. All the miners had to do here was to break down the quartz with picks, after which it was taken on wheelbarrows and dumped into the arrastras, the machines first employed for working it.

The Eberhardt mine, in the White Pine district, one of the richest bonanzas ever discovered, was a find, pure and simple. So, also, was the Sheba mine in Star canyon, Humboldt county, Nev., which contained an ore body very similar to that in the Eberhardt mine. In the same category may be placed the "Razor Blads" veins at Auetin, in the Reese river country, where the rich ore occurred in the very apex of the veins and went down several hundred feet with but little interruption.

If tradition may be credited, a goat-herd, pursuing one of his flock up a steep mountain in South America, laid hold of a shrub, which, giving way, revealed a mass of silver ore so rich that the discoverer, a peon, accumulated a large fortune packing it off and working it in a clandestine manner. This deposit, which proved afterward one of the historic mines of this world, furnishes another example of a mine found already made!

But there is some force in the *Record's* postulate, after all. Human agency has, even in the few instances mentioned, a good deal to do with the creation of a mine—at least of a profitably productive mining property. Nature must, of course, furnish the ore, depositing it under conditions more or less favorable. This done, her agency ceases. She might, it is true, have done a good deal more—might have deposited the pure metal and even coined it into money of convenient denominations. Having failed in this, it becomes necessary for man to supplement her work; hunting after and finding first the ores, then digging them out and extracting from them the precious metals, to be afterward coined into money, converted into jewelry or otherwise disposed of, as interest or fancy may dictate.

The finding of a mine already made is a bit of good luck of such rare occurrence that it must not be depended upon by those who purpose embarking in the business of practical mining. They must make their calculations on a different basis—calculate that they will have to deal with ore bodies as they generally occur in nature; large, small, rich, poor, medium, free, and base; calculate that while some can be easily reached, others again can be reached only under great difficulties. Such being the conditions under which mining for the precious metals has to be carried on, they who would conquer success must be prepared to conform to them, inasmuch as success in this business depends almost wholly on skill, prudence, and well-directed effort—so much so that it may be conceded that our New York contemporary is more than half right in saying "Mines are Made, not Found!"

The river mining companies in the Honolulu district, Klamath river, are getting their claims in order for successful work, two or three companies having already commenced hoisting gravel. The others will shortly have their windmills and wheels completed to start hoisting also.

The hoisting works of the Nevada Queen mine, recently destroyed by an explosion, will be rebuilt as soon as lumber can be procured.

The Petaluma *Courier* reports a new discovery of coal on the ranch of Peter Malone, on the east side of Sonoma mountain.

California Mines on the New York Stock Board.

Listed on the New York Mining Stock Board appear the names of 50 California mines, half of which are there classed as dividend-paying and the other half as non-dividend-paying properties—that is, such as have never paid any dividends at all. It is not to be understood that the so-called dividend-paying mines are all paying dividends at present, for, of the entire number so designated, only five are now actually doing so, the others having paid no dividends for periods ranging from two to six years. The mines here represented as paying dividends at this time are the Plymouth Consolidated, the Sierra Buttes, the Derbec and the Mount Pleasant; the Idaho, at Grase Valley, which has paid monthly dividends regularly for the past ten years, being, by a singular blunder, set down in this catalogue as having been delinquent in this respect for the past two and a half years.

Even after restoring the Idaho to its proper standing, the exhibit is by no means a flattering one—only five mines out of 50 making more than enough to pay their way is not much to brag about! Procuring a mine to be listed on the New York Stock Board is not, however, a true gauge of its merits. A good many of those so listed possess, in fact, no merit whatever, several of these California mines belonging to that class of properties. So far from having made any net earnings, some of these mines have made no earnings at all. But this does not imply that the companies representing them have been without revenues, the assessment machine having, in most of these cases, been vigorously worked, even though little or no work has been done on the mines themselves. A sorry showing indeed would this mining industry of California make, judged by its record in this New York institution! which includes not more than four or five of our first-class mines and scarcely more than a score that are here recognized as being entitled to rank even in the second class, the balance being properties of still lower grade, some of them sheer wildcats!

But the dividend-paying mines listed on the Stock Boards, whether of New York or elsewhere, constitute but a small proportion of the paying mines in this State, a majority of which are owned and worked by small non-incorporated companies or by incorporated companies who have nothing to do with stock operations, and never make any public display of their earnings. We have some 30,000 men employed in the mines of California, earning good wages or making improvements on their properties, few of whom either know or care what mines are listed on the New York or the San Francisco Stock Boards, this being a matter that does not interest them.

The Late William Ashburner.

Prof. Wm. Ashburner, a well-known man on this coast, died at his residence in this city on Tuesday. He was formerly on the State Geological Survey, with Prof. Whitney, and has long been identified with mining interests. He was a mining engineer by profession, though of late years he has done little in this direction. He was Honorary Professor of Mining at the State University, and one of the Regents of the institution. Prof. Ashburner was also a trustee of the Leland Stanford Jr. University. For several years he was president of the Board of Trustees of the California Academy of Sciences, and has served one or two terms as president of the San Francisco Microscopical Society. Prof. Ashburner was also a member of the Historical Society, the Technical Society of the Pacific Coast and the Geographical Society.

The deceased took a very active interest in the affairs of the State University, and he will be greatly missed in the Board of Regents. He was a man held in high esteem for his talents and his social qualities. He was quite active in all of the societies with which he became associated. Of a genial disposition, he made many friends in all directions, and his loss is deeply regretted by a large circle.

The Placerville *Democrat* states that mining men of means are examining into the scheme to tunnel through the mineral belt to the east of Big canyon, and that there is a likelihood of the project being pushed forward at an early date.

Academy of Sciences.

President H. W. Harkness was in the chair at the last meeting of the California Academy of Sciences. Dr. Carl Von Hoffman was elected a member, and Adley D. Cummins and George J. Specht were nominated for membership.

The following contributions to the cabinet were received: Sixteen specimens of copper ores, country rock, etc., from J. R. Souham. Specimens of lava from Mauna Loa, from F. L. Clark. Specimens of fossil leaves from Elsinore, San Diego county, from J. D. Hoff. Vertebræ from fossil skeleton found near San Aido, on Salinas river.

Captain F. L. Clark, of the Hawaiian islands, delivered an instructive address on the Hawaiian volcanoes. He presented to the Academy the first of a series of maps he is making by direction of the King. It is of the south part of the island of Hawaii, showing the position of the crater of Moku-a-wro-wro, on the summit of Mauna Loa, nearly 14,000 feet high. The active volcano of Kilauea is shown on the eastern slopes, with the recent flow of lava from near the summit to the seashore, near the south point of the island. Captain Clark gave many interesting details connected with his subject.

Dr. George Hewetson read Part I of a paper "On Sponges." This paper was illustrated by photo-micrograph stereoscopic views projected on a screen by Dr. E. S. Clark.

Dr. H. H. Behr read a brief memorial of the late Dr. Albert Kellogg, and on motion the following preamble and resolutions were read and adopted:

WHEREAS, Our co-worker in the field of science, Dr. Albert Kellogg, whose amiable qualities of head and heart won the friendship of all who knew him, has, by that divine and inscrutable Providence which governs all things, been removed from his late sphere of action and consigned to his last resting-place of mortal man; he it

Resolved, That it is with sincere regret that the officers and members of this Academy of Sciences have received the announcement of his death, and we do hereby desire to express our sympathy with the relatives and friends of the deceased.

Resolved, That this memorial paper and these resolutions of condolence and respect be spread in full upon the minutes of the Academy.

President Harkness announced the death of Dr. F. H. Jensen, a resident member of the Academy. He called upon Dr. Behr, who gave a brief sketch of his friend's life. Dr. Jensen was born in Germany in 1847 and died in San Francisco last week of consumption. He was educated as a chemist and took a high rank in the University. His specialty was the preparation and use of explosive compounds, and he was employed for some years in the great tunnel of St. Gothard. In 1880 he went to Peru for his health and thence came to California as chemist for the Giant Powder Company. By his death at the early age of 40, the scientific world has lost a devoted student and the Academy a worthy member. Dr. Jensen was also a member of the Technical Society of the Pacific Coast.

Mining Accidents.

On Monday last Terrence Smith was crushed to death at the Mabel Drift mine, North Bloomfield, by a boulder falling on him. Deceased was an old resident at Moore's flat, and leaves a wife and five children.

Thomas Harris was killed by a mass of coal falling on him, on Tuesday last, in the Vancouver Coal Co.'s mine at Nanaimo.

George Pasent was hurt at his drift claim at Tippecanoe, Sierra county, last week. He was working with a self-acting ground-sluicing apparatus; the gate getting out of order, he got down in front of it to fix it with a crowbar, when the gate suddenly raised, the water caught him and carried him over a fall of 12 feet and a long way down the ravine, where he caught on a piece of timber projecting into the stream, and was helped out by the man who was working with him. He was badly bruised, but his injuries are not dangerous.

The Grand Parlor of the Native Sons of the Golden West has been in session at Nevada City, this week, the guest of Hydraulic Parlor. They visited the Manzanita hydraulic mine. It was expected some time ago that arrangements would be made for putting up a monitor and running water through it for half an hour, so as to show those of the visitors who had never seen hydraulic mining what it looked like. Although no injury whatever would have happened from this short exhibition, the Anti-Debris Association caused a notice to be given forbidding turning on of the water.

New Smoke-Consuming Furnace.

Charles C. Carter, of this city, has just received a patent, through the MINING AND SCIENTIFIC PRESS Patent Agency, for a smoke-consuming furnace of that class in which a suction-fan or blower is connected with the smokestack and with the fire-chamber, whereby the smoke and other products of combustion are drawn from the stack and forced through the furnace again. Mr. Carter's invention consists in a conical or inverted funnel-shaped hood located within the smokestack and having a diameter a little less than that of the stack, a second hood located within and concentric to the first hood, and of a diameter enough smaller than the outer hood to leave an annular space between the two; a pipe or passage through the apices of both hoods and communicating with the annular space between them and the pipe from the suction-blower; a damper controlling the pipe or passage below its communication with the annular space between the hoods, and a damper controlling it above its communication with the suction-blower pipe.

In smoke-consuming furnaces of this class it has generally been the custom to stop the suction-pipe from the fan-blower at the inner surface of the stack. The disadvantage of this has led to an improvement, by placing within the stack a conical or inverted funnel-shaped mouthpiece or hood which communicates at its apex with the pipe from the fan-blower, and it is also provided with apertures or ports in its sides, which are controlled by gates operated from without, whereby, when said gates are open and the fan communication closed, the natural draft may take place uninterfered with; and, after this draft has become sufficiently strong and has served its purpose in firing up, then by closing the gates the smoke and products of combustion are confined to the mouthpiece and are drawn up by the fan and discharged into the furnace again.

Experience has shown Mr. Carter the disadvantage of this form of consumer. The funnel-shaped mouthpiece has a diameter a little smaller than the stack, and therefore there is left an annular space around its rim and between it and the inner surface of the stack, through which a portion of the products of combustion passes by the natural draft. It has not been deemed best to close this point of natural draft, as a certain amount is found necessary; and when the damper closing the main natural draft is closed, the smoke and products of combustion have either to find an escape through this annular space between the hose of the mouthpiece and the

stack, or to pass into the body of the mouthpiece and thence into the pipe connecting with the suction-fan. The suction, while very strong in the upper end of the mouthpiece, is very weak at its base, because at that plane the area of the mouthpiece is so great that the force of the suction by distribution is diminished. Therefore, while it is true that a great portion of the smoke and products of combustion passes up into the mouthpiece, a large portion also escapes by the annular passage between the rim of the mouthpiece and the interior surface of the stack.

The object of Mr. Carter's invention is to overcome this difficulty by applying the suction where its power may be employed to a greater advantage and less of the smoke and

products of combustion allowed to escape, almost all being drawn in by the suction. This is accomplished by transferring the point of suction from the apex of the funnel-shaped mouthpiece to the base of the hoods.

Richards' Patent Hydraulic Machinery.

NUMBER 4.

These machines, on which a patent is now pending, are a departure from the usual method of draining overflowed lands.

As may be seen, they are of very simple construction and less than one-half the size and

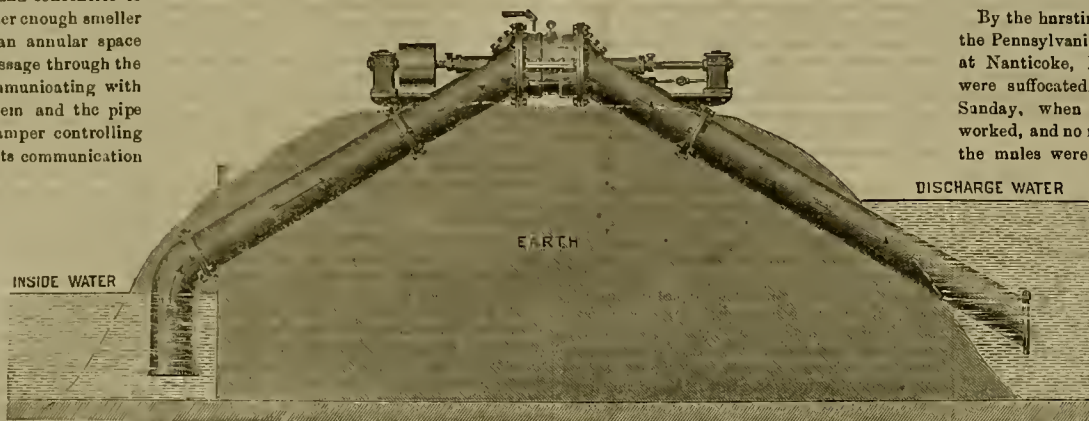


Fig. 7.—RICHARDS' SIPHON DRAINING MACHINE.

cost of centrifugal pumps of similar capacity. They besides require no foundations, being held by the pipes as shown in the drawing. The shafts stand across embankments in position to be conveniently driven by portable engines, so that permanent steam-power is not required

process of construction. The cars are running regularly every half hour, and more frequent service will be put on as business increases. On Sunday we run four cars, and carry during the afternoon about 1500 passengers a distance of three miles with perfect ease. Our usual speed

The Los Angeles Electric Railroad.

We have received from C. H. Howland photographs showing the cars, etc., of the Los Angeles electric railroad, from which we have made the engraving which appears on this page. Mr. Howland, who is manager of the Los Angeles Electric Railway Co., sends us the following description of the road:

"This is the first electric road constructed on the Pacific Coast, and the most complete and successfully running road in America.

"It is at present completed and in regular service for three miles. Two miles more are in

improvements over the Baltimore plant.

"Our road has but few grades, and one short one about 150 feet per mile. At Baltimore the grades are 353 feet per mile. At Pittsburgh the same company is putting in a road with grades 750 feet per mile.

"Los Angeles has been the pioneer for electric lighting, and now steps ahead of any city on the Pacific Coast in electric railways. Should San Francisco enterprising desire to introduce electric railways, all necessary information can be obtained at Los Angeles."

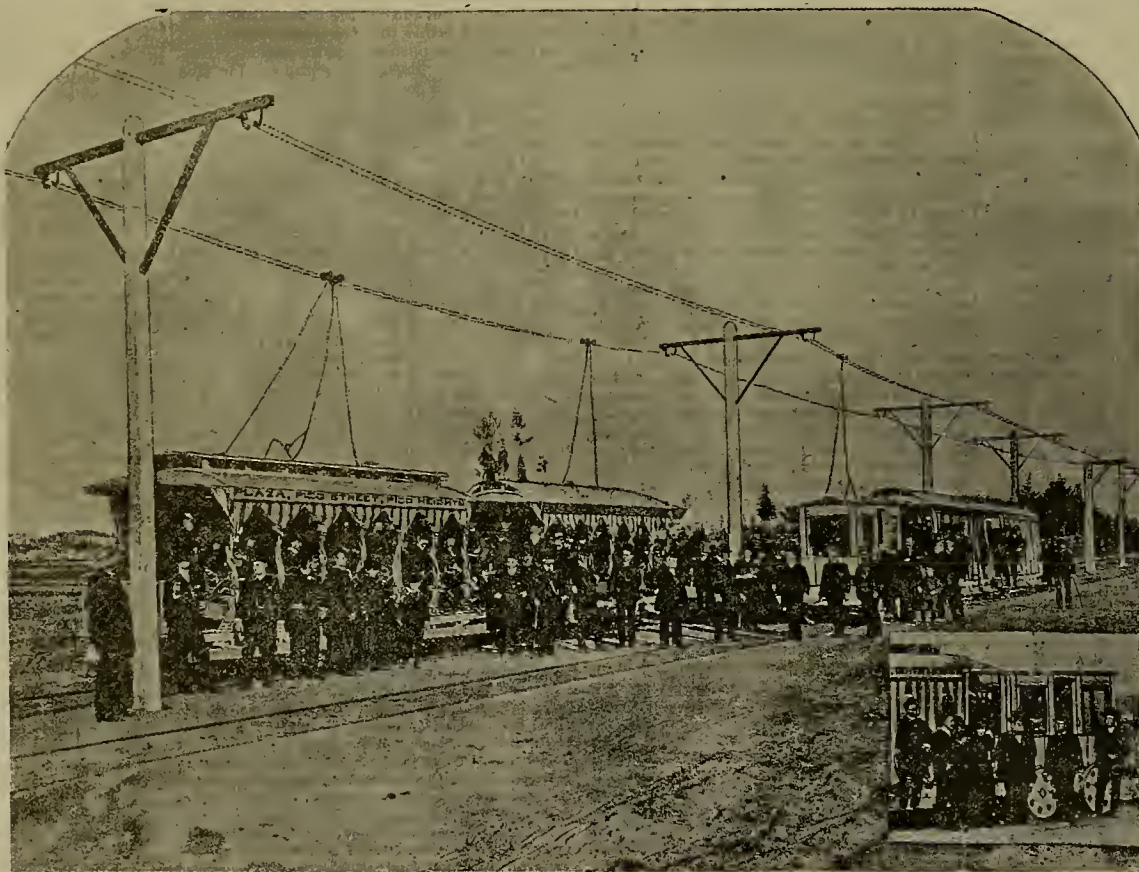
Steam Pumps in Mines.

By the bursting of a steam pipe recently, in the Pennsylvania Coal Company's No. 2 shaft, at Nanticoke, Pa., a large number of men were suffocated. The accident happened on Sunday, when the colliery was not being worked, and no men were below. The fact that the men were suffocated in a few minutes

proves that the men employed in the vicinity of the bottom of the shaft would have shared the same fate if the accident had occurred on a working day. Those in less ventilated portions of the mine would also have been in a dangerous position. In pumping from these deep workings, where heavy volumes of water are raised, a great deal of steam is used,

and on the bursting of a pipe, a great volume of steam can escape before means can be adopted to stop the flow. Passing into confined workings, this steam would be most dangerous. In fact, this is considered by Pennsylvania coal journals as a new element of danger added to the already hazardous occupation of mining for coal. Such accidents do not often happen, but the liability is something to be considered.

The *Mining Herald and Colliery Engineer*, in speaking of this accident, says: The employees of more than half the collieries in the anthracite coal regions are exposed to just such danger. At the bottom of nearly every shaft or slope there is one or more large steam pumps, propelled by steam, and the sudden bursting of a steam pipe, as in the case of the Nanticoke accident, must endanger the lives of every person employed in the mine. The steam pump is a necessity, or at least has come to be regarded as such, and until something better suited to the work of draining mines is invented, will continue to be used. The only means, therefore, providing for the safety of the men employed in the mines against such accidents as this, is by the use of downcast instead of upcast fans. If the main opening of the mine be an upcast and an accident of this kind should



ELECTRIC ENGINE AND TRAIN ON LOS ANGELES ELECTRIC RAILROAD.

except for the larger sizes. There is no limit to size or capacity unless the work is to be done by portable engines, in which case it can be subdivided by using several machines as one plant, or on one tract of land. The smallest size in contemplation is 12 inches, capable of discharging 4000 to 5000 gallons a minute. Arrangements are now being made for testing the economy and efficiency of these machines, after which they will be erected under proper guarantee of successful performance. The water-driving details of the machine will not be described here, but will be given with suitable drawings at some future time.

FROM BUTTE, M. T., the hullion shipments last week were \$191,328.

is from 10 to 12 miles per hour; sometimes 15 miles per hour; can run 20 miles per hour.

"We use at present a 30-horse power engine at the station generating the electricity, which is conveyed by overhead wires to any portion of the line, and connected with the motor on the cars by a trolley running overhead.

"The cars used are provided with seats for 35 passengers. We have had them crowded with as many as 97 passengers.

"The road can be constructed at one-third to one-quarter expense of a cable road, including equipment, and can be run at greater speed and at less expense. The system invites the most rigid examination.

"The system used here is the Daft system, the same as that used at Baltimore, but with many

occur, the steam would be forced up the shaft or slope, and would be prevented by the air currents from finding its way into the distant workings. This would reduce the danger in case of such accidents to a minimum, but with upcast fans and a volume of air to carry the steam in upon the men at work in the distant recesses of the mine, the danger to be feared from such accidents is really appalling.

THE *Territorial Enterprise* says: At this season of the year there is a vast deal more water flowing down all the rivers of Nevada than can be utilized by the mills or on the ranches. What is wanted is reservoirs in which to catch up the water that is now running away.

MECHANICAL PROGRESS.

A New Steel for American Safe Manufacturers.

The English correspondent of the *American Manufacturer* says that a new steel possessing peculiar properties, which, it is thought, will recommend it to the safe and strong-room manufacturers of the United States, is now being manufactured by the New British Iron Co., Congreaves Works, near Birmingham, England. He has inspected samples of the new metal, whose nature consists of a very soft exterior and a very hard interior. This is not accomplished by the welding of two steel plates in juxtaposition, as is frequently done with regard to steel and iron composite plates, but the metal is rolled all at once. The difference in structure is not observable as the metal leaves the works for the address of the consumer; it is not until the consumer has himself manipulated it that the change which constitutes its value occurs.

The Merits of the New Steel.

The steel all through is at first sufficiently soft to allow of the operation upon it of all the necessary fitting and drilling occurring in the building up of safes or strong-rooms, and the instructions to the user are that, after fitting and drilling have been performed, the metal should be reheated red hot and plunged into water, when the interior section becomes so hard as to be perfectly drill-proof, while no change occurs in the nature of the outside section, so that being soft it will resist the burglars' sledge successfully. Rivets are made of the same material in the same way for riveting together the various parts of the structure.

Price of the New Material.

The prices of the new material in plate or bar form is \$80 f. o. b. Liverpool, which price compares very favorably with the figure, something like \$125 per ton, which has hitherto had to be paid for Sheffield steel of a similar nature.

Already samples of the new material have found their way to some 54 of the leading safe manufacturers in your country, and expressions of opinion have been invited upon them. The result has been wholly favorable, and such as to lead the manufacturers to believe that a profitable market can be found upon your side. One or two firms remarked that by the operation of the blow-pipe the temper of the interior of the steel could be taken out, but it is hardly to be supposed that burglars would provide themselves with special appliances of this description.

A New Material—Vulcabeston.

This is the name of a new article, intended to combine all the valuable qualities of asbestos and India rubber, of which, as its name indicates, it is mainly composed, although other vulcanizable materials enter into its composition. It forms a substance of the toughness of horn, although it can be made of any degree of flexibility; it is a non-conductor of electricity, and stands the severest test of acids, steam, gases, etc. From its quality of permanently resisting heat, which has been so long known as the characteristic feature of asbestos, it has been adopted by the United States Government for use around steam engines.

One of the most important uses of the new article is as a molded piston-rod packing ring, made to fit any sized rod or stuffing-box, and to be sprung in place with a slight pressure, one or more rings being used as desired, and forming a perfectly tight seam joint. These rings do not wear the rod as do metal rings, and they are self-lubricating. The first set made of these rings has, it is said, been in use over 11 months, in a Hartford, Conn., manufactory, on an engine run at 280 strokes per minute, and is still in perfect order, and said to be in as good condition as when first put in.

Vulcanized asbestos piston-rod packing, in the form of flexible rope, of all sizes, will not shrink or blow out, and is especially adapted for use on locomotives and ocean steamers, and in other places where loss of time in repacking is of the greatest consequence, and when the use of ordinary steam packings would, consequently, be entirely inadmissible. In consequence of its great strength and durability, it can be used wherever metallic packings have heretofore been necessary.

The new vulcabeston is made into sheet packing, hard, medium and soft, in sheets or rolls, in all sizes of round and oval gaskets, and in hard and medium-molded piston-rod packing rings of all the regular sizes, any special forms being readily made to order. The vulcabeston can, if desired, be made of any color, and is thus well fitted for a variety of ornamental work and other special uses. This material is manufactured by the H. W. Jobne Manufacturing Co. of New York.

USING OIL IN BOILERS.—The *Manufacturers' Gazette*, of Boston, recently published several articles on the use of oil in boilers. The editor, who is a practical man and one who has had considerable experience in the matter, says he believes "in a limited amount of oil, and that is crude petroleum, first, last, always and only. The quantity to be used is very, very small. We would take in every instance a boiler which had a slight amount of scale upon it, release every particle of this scale or sediment,

blow it out, and keep it out, and we are sure that our readers will profit by following the direction which have been given so many times, with increased safety to themselves and an advantage in economy, and we believe it is just as applicable to a cast-iron as a wrought-iron boiler, although we have not positively proved that such is the case from any actual experiment or test." The *Scientific American* says on this subject: "The proper way to use the crude oil is to send it into the boiler through the feedwater, only once a day, and only in very small quantities. One-half an ounce per day will keep an ordinary tubular boiler of 50-horse power as clean as possible; and after a few months of regular use the shell will be found as smooth as a piece of japanned work, provided it was not pitted at the start, and the tubes will be perfectly clean and smooth. The oil must be introduced into hot water, and for some reason it does its work better under pressure. If any 'constant feeding' of the oil into a boiler takes place, the fire seems will commence to leak, for this has been tried; there seems to be a call for only a small amount of the oil, and the small amount must not be exceeded."

ALUMINIUM STEEL.—Messrs. S. French and B. M. Plumb, of 36 Lombard street, E. C., London, the European agents of the Cowles Electric Smelting and Aluminium Company of Cleveland, Ohio, are showing two interesting samples to illustrate the beneficial effects of the addition of small quantities of aluminium to steel. Each specimen consists of a bar of iron, and a bar of Siemens-Martin basic steel welded side by side and broken off. In one specimen, however, the steel contains one-fifth of one per cent of aluminium, while in the other the metal is of the ordinary quality. In this latter case the position of the weld is clearly visible, there being a clear line between the crystalline structure of the iron and the fine grain of the steel. But in the former sample no such line is to be seen, and the characteristic of the steel appear to extend far into the iron, rendering it impossible to tell by the appearance where one ends and the other begins. The same firm has also a forged bar of aluminium bronze, containing five per cent of aluminium, which has broken in this testing machine at a strain of 36 tons per square inch of original section, and with 60 per cent elongation. A bar of this metal forged, bent, and broken in company with a similar bar of Siemens-Martin basic steel, exhibited characteristics identical in every respect except color.

THE INTELLIGENT MECHANIC'S LABOR.—A group of gentlemen were discussing the necessity of brain labor in some life vocations, and after allusions had been made to several well-known citizens who were successful and prominent in their professions, one of the speakers, himself a retired merchant and influential politician, declared that Blank, naming a draftsman and inventor employed in a large machine tool manufactory, did more brain labor than any other man in the city. Some examples were cited of well-known mechanics, and the conclusion was reached that intelligent mechanical labor required as much solid thinking as any other way. The intelligent, valuable mechanic is not a mere walking machine; materials are not always plastic; they are sometimes perverse, and judgment and calm consideration are required in their management. The parts of a machine, however closely planned, do not come together unaided and naturally, as eye-stones converge in a caucor of vinegar; it requires head work to "assemble" the parts of a machine of any kind, and nowadays when mechanical work requires an accuracy of proportions and a nicety of dimensions such as were not dreamed of a generation ago, the mechanic who is not brainy in his line will surely get left.—*Ex.*

RAPID WORK.—Some idea of the extent to which mechanical ingenuity and efficiency have advanced may be had from the following statement: "It is now possible to construct a complete sewing machine in a minute, or 60 in one hour; a reaper every 15 minutes, or less; 300 watches in a day, complete in all their appointments. More important than this, even, is the fact that it is possible to construct a locomotive in a day. From the plans of the draughtsman to the execution of them by the workmen, every wheel, lever, valve and rod may be constructed from the metals to the engine intact. Every rivet may be driven in the boiler, every tube in the tube sheets, and from the smoke-stack to the ash-pan, a locomotive may be turned out in a working day, completely equipped, ready to do the work of 100 horses." Without such machinery and the skilled labor to operate them, the civilized world of to-day would be an impossibility.—*Ex.*

GRATE BARS UNDER A BOILER.—In placing grate bars under a boiler, the usual practice, when using coal, is to place the bars from 22 to 24 inches below the boiler to get the best results. In large wood-working shops, when shavings, etc., are used, the distance is usually about 28 inches. Grate bars should be about three inches lower at bridge-wall than at fire-door. Bridge-wall should be built up to within eight inches of the boiler, and have from one-sixth to one-eighth the area of the grate. The best plan for burning sawdust (in large quantities) is to have the furnace extend further forward than the boiler, and have a feed "well-hole," through which to introduce the sawdust, above the regular "stoking" door.

SCIENTIFIC PROGRESS.

Sea Telephony.

A report from Fort Myers, Florida, where Mr. Edison is sojourning, says that he is working on his sea telephony. The inventor says that already he can transmit sound between two vessels from three to four miles distant, the one from the other, and he seems confident, now the principle is established, that he will be able to increase this distance between his stations as the apparatus becomes more perfect.

The Florida waters are peculiarly favorable for experiments of this nature, because of the absence of steamers upon them, or other disturbing sounds on the adjacent shores—resembling in their quiet repose the waters of the open sea, where the invention he is striving to perfect will find its most important application.

Up to the present time, Mr. Edison has not succeeded in transmitting articulate speech through his sea telephones, nor is this essential to the success of the system. By means of submarine explosions, he is enabled to form a series of short and long sounds in sequence, and by these, as in the Morse system of telegraphy, words and sentences can readily be transmitted.

In the original experiments in this direction, made by Prof. Trowbridge, and from which these have sprung, two vessels, each furnished with an electric generator and a steam engine, were anchored a mile or two apart in quiet waters. Wires charged with the current were hung over their sides into the water, the upper ends being connected with the telephonic transmitter and receptor. It was sought to send articulate speech between them, and when the two were quite near together, this, it is said, was readily accomplished. Later, however, this seems to have been regarded as impracticable, and the system, now experimented upon by Mr. Edison, of transmitting short and long sounds, was adopted, and, up to a certain point, gave no little promise.

The distance which separates the purely scientific from the practical success is so wide, however, and the way is so beset with obstacles, that it is no easy matter to find, or if found to keep, the right road, and so it was that these first experiments, valuable as they were, soon ended, and it remains for the practical man, the experimenter rather than the student, to take up the problem and push it on to a solution. Edison is peculiarly fitted and equipped for this work. When in good health, he is a close and constant observer, tireless and original. If he succeeds in finding a practical and reliable means of transmitting any kind of intelligible signal through the water between two vessels several miles apart, a principal cause of disaster on the ocean will have been removed. Though many ingenious and admirable contrivances have been thought out of late years to lessen the dangers of ocean travel, nothing has been done to prevent collisions in thick or foggy weather, which may fairly be said to be the most menacing of all.

Were the sea-telephone perfected, however, collision in thick weather could readily be averted. Vessels would keep their telephone warning going, as well as their whistles, and, while the latter only sounded a general alarm, the telephone would give the exact compass course of the direction whence each ship was advancing, and this, too, in time to prevent a meeting.—*Scientific American.*

OXYGEN IN VITAL PHENOMENA.—Some interesting information is given by Dr. B. W. Richardson, respecting the influence, under varying conditions, of oxygen in vital phenomena. It was obtained by inclosing mice in glass chambers containing atmospheres in which the proportion of oxygen varied with the experiment, and observing the time that elapsed before the animals became narcotized at different temperatures. It was found that at a temperature of 55° F., when oxygen and nitrogen were present in the proportion of one and four (i. e., common air), the animal became narcotized, and died asleep, in one hour and 50 minutes. In two parts of oxygen and three of nitrogen, as well as in three of oxygen and two of nitrogen, the animal remained free from narcotism 30 minutes longer, but eventually became rapidly narcotized and died within two minutes of the same time. But with four volumes of oxygen and one of nitrogen, narcotism did not occur for two hours, and then lasted six hours before death took place, while with pure oxygen, narcotism was also deferred for two hours, but only lasted four hours. When the temperature was lowered to 20° F., the effect was to reduce the vital combining power to such an extent that oxygen became practically an anesthetic gas; in pure oxygen the animal was narcotized in a few minutes and died in half an hour, while in common air the animal remained longer awake, but died in 45 minutes. When temperature was raised to 70° and 90° F., pure oxygen sustained life longer than common air in equal volume, but at 125° F. coma and death took place in 15 minutes.

THE MEDICAL POSSIBILITIES OF PHOTOGRAPHY.—The *Evening Post* says: "In the *Camera* magazine a very curious phenomenon, in connection with photography, is recorded by the person who observed it. He took a portrait of a child apparently in full health and with a clear skin. The negative showed the face to be

covered with an eruption. Three days afterward the child was covered with spots due to prickly heat. 'The camera had seen and photographed the eruption three days before it was visible to the eye.' Another case of a somewhat similar kind is also recorded, where a child showed spots on his face a fortnight previous to an attack of smallpox. It is suggested that these cases might point to a new method of medical diagnosis."

SINGULAR AND INTERESTING EXPERIMENT.—In an experiment recently made before the Society of Chemical Industry, in England, one of the members is reported to have proved not only the possibility of a flameless combustion of gas, but also to have practically demonstrated the enormously high temperature capable of being obtained by such flameless combustion. Taking a hall of iron wire, about three pounds in weight, he placed it on a slip of fire-clay, and directing a blow-pipe on it for a few seconds, suddenly blew the flame out; the temperature increased so rapidly that in a few seconds the wire began to fuse and run into drops, and this temperature was steadily maintained. The room was darkened, but the closest examination did not show a trace of flame, though the fact that the gas was being consumed was proven by repeatedly relighting and extinguishing it. This same experiment was repeated in another form by directing the flameless heat into a small fire-clay chamber in which a refractory clay crucible, made especially for nickel-melting, was partially fused and worked into a ball like soft putty—the sides of the fire-clay chamber being at the same time fused. The heat was so great that the blow-pipe laboratory was much too hot for comfort, even during the evening succeeding the experiment.

MORE INSTANTANEOUS PHOTOGRAPHY.—Mr. Mallin, a photographic artist, of Southampton, England, has recently been very successful in taking instantaneous photographs of flying gulls. Animals in far more rapid movement have been photographed by Mr. Muybridge, in America, or M. Marsy, in France; but these are produced by special apparatus, and rarely give much more than a silhouette of the object photographed. The photographs of the gulls were taken by Mr. Mallin under ordinary conditions and with ordinary apparatus; but the lens must have been a good one, and a very rapid shutter must have been employed. The plate also must have been of special high sensitivity. About 60 birds are shown quite sharply and distinctly, and their various attitudes are curious. Most of them have the wings spread in the orthodox manner, but some of them are caught in the position with the wings hanging down, which, from the shortness of the time during which it is maintained, the eye does not appear to catch. The photographs are striking examples of the speed with which objects can now be thus reproduced.

THE PRINCIPLE OF INERTIA.—In treatises upon physics and mechanics, inertia is defined as that property of matter which prevents it from putting itself in motion when it is at rest, or from bringing itself to a state of rest when it is in motion. It is by virtue of the principle of inertia that dust is expelled from our clothes when they are beaten, every particle of it tending to a state of rest. Although we have cited numerous experiments on the principle of inertia, we shall mention another one which has been pointed out to us by Mr. H. Gilly, licentiate of sciences: Upon the forefinger of your left hand, held vertically, lay a visiting card, and upon this place a silver dollar and try to remove the card without touching the coin. In order to do this, give the card a smart flip with the fingers of the right hand and it will fly to a distance, leaving the coin balanced upon the forefinger. Care must be taken to give the flip in an exactly horizontal direction and in the plane of the card.—*La Nature.*

A VALUABLE INVENTION.—A peculiarly constructed microphone is now being used in Germany for the purpose of detecting loss of water through leakage in town mains. The apparatus consists of a steel rod, which is placed upon the cock in the neighborhood of which the leak is suspected, and a microphone attached to the upper end of the rod. A dry battery and a telephone complete the equipment. No sound is heard in the telephone if the cocks are closed and no leak occurs; but a leak even of a few drops through a badly fitting cock causes sufficient vibration in the pipe to affect the microphone and give audible sounds in the telephone. At a recent meeting of gas and water engineers, in Eisenach, it is stated that the apparatus is so simple to handle that, with a little practice, ordinary workmen are able to detect and localize any leak.

SUNLIGHT ON VITALITY.—M. Duclaux has studied the influence of sunlight on the vitality of micrococci. A few hours' exposure to the sunlight weakened the pathogenic micrococci, and finally killed them. The inference is, that sunlight is a universal hygienic agent, one that is most active and powerful, common to both private and public sanitation.

NATURALLY BLIND CREATURES.—There are 172 specimens of blind creatures known to science, including crayfish, myriapoda, etc. They are mostly white, whether from lack of stimulus of the light, or from bleaching out of the skin. Some species have small eyes and some none.

ENGINEERING NOTES.

Tests of Wood for Building.

The recent numerous accidents from the breaking down of wooden bridges, and the less frequent ones of the giving way of floors and buildings, give a peculiar significance, at this time, to the following extracts from an article in a late number of the *Age of Steel*, by J. B. Johnson, Director of the U. S. Testing Laboratory at Washington University:

If one is ignorant of the character and strength of his material, he is as badly off as if he knew not the stresses to which it was to be subjected. What shall we say, then, of those builders and designers who know neither the one nor the other? There are few more astounding facts than this, that a large proportion of the structures which are daily erected, to the safety of which we trust our lives, are little better than blind guesses as to their ability to stand the loads to come upon them. Usually, however, the guesser—that is to say, the designer—tries to be sure and guess large enough; but he occasionally guesses too little, and not unfrequently guesses so large as to make the cost unnecessarily great. Custom is made to determine the dimensions of the structure and the character of the joints, whether for a warehouse, an elevator or a dwelling; a machine, a vehicle or an engine.

Manufacturers, builders, architects and too many engineers rely solely on the tables and formulae given in the trade or engineering handbooks. They know nothing of the original experiments from which the tables are derived, and too often are unable even to verify the truth of the formulae. As a matter of fact, the portions of these books referring to the strength of materials, and especially of wood, were based on experiments on small specimens and were made about 100 years ago! Some of the arguments in favor of a new test are given below:

All the old tests were made in England, and, as already remarked, on small specimens. The Western American woods have never been fairly tested for strength. Such tests as have been made on large specimens of American wood have shown the strength to be only about one-half what all the tables give them. Many cheaper kinds of timber may prove more valuable for structures than more expensive varieties, which have been supposed to be stronger.

Thus pine supports or pillars have been found stronger than oak ones, when tested in full-sized samples. Notches cut in beams or joists, whether at the ends or in the middle, have been found to weaken the pieces a great deal more than is generally supposed. When a joint is notched into a floor beam or header, it is only about one-half or one-fourth as strong as when left full size and resting on the bottom. It always splits from the notch. If the portion below the notch be sloped off so as to come to the full depth at the middle, the strength is doubled. That is to say, by removing a portion of the joint (in case of a notch), the strength is increased. This seems paradoxical, but it is true in practice and consistent with theory. It then does not fail by splitting from the end, but by breaking apart in the middle. The shearing or splitting strength of timber is of great importance in struts, and is almost always overestimated. A few well-arranged tests will give more information to the designer than all the tables in the handbooks on these matters.

CAPT. EADS AND THE PANAMA CANAL.—Whatever may be the effect of the death of the dauntless inventor, Captain Eads, on the future of the proposed interoceanic ship canal, that great competing enterprise, the Panama canal, now gives promise of successful completion. The indomitable de Lesseps declares that his mind is perfectly at ease in regard to the progress of the work, and that in three years the Panama canal will be opened for navigation, without a lock to intercept the free passage of vessels from one ocean to the other. The work of cutting through the rocks is being pushed with great vigor by the contractors, and the use of electric lights will soon enable them to turn night into day and work a double force, making it possible to do six years' work in three. Although the cost of this enterprise will be prodigious, greatly exceeding early estimates, and although obstacles in the form of disease among workmen and discontent among stockholders have tended to discourage the enterprise, the venerable de Lesseps does not seem to have lost heart for a moment, and it now looks as if the old man might live to see the completion of this, one of the greatest engineering achievements of the age.

A USEFUL AND APPROPRIATE MONUMENT.—Engineer Symons, U. S. A., has prepared plans and specifications for a memorial bridge across the Potomac, at Washington, in honor of General Grant. The center length of the bridge as designed is 4650 feet, 1339 feet less than that of the Brooklyn bridge. The central span is 160 feet wide in the clear, the main arches span 240 feet, and the smaller arches span 120 feet. The carriageway is 40 feet wide, and the two sidewalks 10 feet each, making the total width of the bridge 60 feet. The cost is estimated at \$10,000,000.

It has been discovered that a few hundred dollars' worth of gold specimens have been stolen from the State mineral cabinet at Sacramento.

GOOD HEALTH.

The Cancer Disposition.

We this week publish a letter received from Col. F. A. Bee, Chinese Consul of this city. Mr. Barton, the writer of the letter appearing in last week's issue, desires us to state that he will be most willing to give any information in his power to those who may so desire. We feel it our duty to thank those who have come forward, with freedom and graciousness, to give their testimony. Many others have promised to do likewise—assist as in our efforts to collate evidence. Mr. Barton's address is 2422 Buchanan St., S. F.

Sir: I have read with considerable interest the various communications in your journal relating to the query "Can cancer be cured?" I am prompted in this connection to give you a case that came under my observation directly in point. I had, in my employ in this consulate, a gentleman who, for over five years, acted as marshal and clerk. During three years he was afflicted with a sore, the size of a dollar, on his right hand, between his thumb and index finger. He used *ad libitum* every healing salve, ointment, plaster and poultice that he could hear of, but all to no purpose. Well-known physicians of this city prescribed remedies. Finally his fears that it was a cancer prompted him to consult two well-known surgeons. They made a diagnosis and informed him that it was a cancer, and a time was set to remove it with the knife. On informing me of this decision I requested him to permit me to have it examined by a practitioner who, I had been informed, had cured several cancer cases. He readily consented, and three weeks after he brought the cancer into my office preserved in alcohol. He remained in my service for over a year thereafter and there was not, nor has there been since, any signs of its return. If it was not a cancer then the medical gentleman prevaiated. Yours truly,

F. A. BEE.

The Effect of Strong Light Upon the Eye.

The exposure of the eye to intense light has been attended with many curious and unfortunate results. In the case of Prof. J. Plateau, of the University of Ghent, who, while trying to observe the effects of irritation of the retina gazed steadily at the sun for 20 seconds, a chronic irido-choroiditis developed, which ended eventually in total blindness. Dr. J. A. Andrews, in an article upon this subject, collects a number of cases in which choroiditis and retinitis occurred in persons who had observed an eclipse of the sun. The single flash of a sun reflector has been known to cause retinitis, and other temporary visual disturbances of a functional character have been frequently noted. M. Reich has described a curious epidemic of snow blindness which occurred among a body of laborers engaged in clearing a way through the masses of snow which obstructed the road between Passanaur and Meti, in the Caucasus. The rays of the sun, reflected from the vast stretches of snow on every side, produced an intense glare of light, which the unaccustomed eye could not support without the protection of dark glasses.

A few of the starkest among the laborers were able to work with impunity, but the majority suffered severely. Among 70 strongly marked cases, 30 were so severe that the men were absolutely unable to continue their work or to find their way home. They were collected in a covered place, where Reich found them on his arrival prone on their faces, striving to hide their eyes from the light, and crying out from pain. Recovery was gradual but complete.

W. C. Rockliffe records a case of acute conjunctivitis brought on by exposure of the eyes to a 3000 candle-power electric light. It is estimated that exposure of the naked eye for one minute to an arc light of 2000 candles will cause conjunctivitis. The violet or orange lights are said to be less injurious than the normal white light.

The light of lightning is too transient to cause any injury from simple retinal over-irritation; but it is known that cataracts sometimes follow lightning strokes, and these are believed to be produced by some physico-chemical influence.

Glassblowers suffer from an opacity of the lens, brought on, not by the light, but the intense radiant heat (145° F.) to which they are exposed during their work.

Of all forms of artificial illumination, the incandescent electric light, so far as facts now go, is the best. Among 1100 persons who worked by this light, Dr. Andrews found not a single case of injury. On the other hand, many persons testified to the fact that they could work longer by it with less fatigue than with the gas or oil light. This is due, it is found, to the steadiness, absence of heat, and perhaps the greater proportion of violet rays. Short-sighted persons are, in particular, benefited by the use of the incandescent lamp.—*Medical Record*.

TAKE SUFFICIENT DRINK.—Medical authorities now declare that it is of vital importance to health that the system should receive daily a sufficient quantity of water to amount to what sailors would call a "flushing"—that is, sufficient to wash away the waste. Most of

the matter which should be excreted is solid, and requires a comparatively large volume of fluid to dissolve it so that it may be cast off, an example of which may be seen in the case of uric acid, which needs several thousand times its weight in water to dissolve, or else it crystallizes in the shape of calculi, or produces other disease. Three and a half pints of water or other clear fluid, not obstructed by semi-solid contents, should be taken daily by every adult, and by large people as much as 4½ or 5 pints, in order to keep the cells of the kidneys well washed out, the effete waste matter from the possibility of depositing itself where it may do harm, and the system in health generally.—*Harper's Bazar*.

DISINFECTING FROM WHOOPING COUGH.—The following method of disinfection of sleeping and dwelling apartments and clothes is recommended by M. Mohn in the treatment of whooping cough. It is said to cure the cases immediately. The children are washed and clothed in clean articles of dress, and removed to another part of the town. The bedroom and sitting-room or nursery are then hermetically sealed; all the bedding, playthings, and other articles that cannot be washed are exposed freely in the room, in which sulphur is burnt in the proportion of 25 grammes to the cubic meter of a space. The room remains thus charged with sulphurous acid for five hours, and is then freely ventilated. The children return the same day, and may sleep and play in the disinfected room.—*Lancet*.

TO PREVENT PITTINO IN SMALL-POX.—Dr. A. S. Deane says that when he was physician to a large fever-hospital in Ireland, a young girl was admitted in the vesicular stage of semi-confined variola. He was experimenting at the time on the various methods proposed for preventing pitting. The plan adopted in this particular instance was to cover the face with a paste of whiting mixed with carbolic oil, while the patient's hands were confined in a sort of strait-jacket. The result was eminently satisfactory. No scar remained anywhere, except on the point of the chin, where the friction of the bed-clothes continually rubbed away the application.

EXERCISE.—It is gratifying to note that the masses of the American people are realizing the benefits of healthful exercise, and it is a great satisfaction for this generation to know that the result will be the production of a more perfect race of men, both intellectually and physically endowed with the glory of perfect manhood, a sound and vigorous mind in a healthy body.

USEFUL INFORMATION.

Cheapening and Adulterating Goods.

There are many spasmodic complaints of impure, adulterated, imperfect and unsound articles of production offered to purchasers and consumers, and remedies asked for. The sugar is adulterated with sand or glucose, the coffee and spices with various foreign cheaper substances, the woolen goods are part cotton, or hair or shoddy; the silk is weighted and stiffened with colors and jute and cotton, the iron is part cinder, or from poor ores; nails made from scrap and old rails, steel is anything but steel, our silver is platinum or zinc, or sterling or nickel; our gold is copper and zinc and tin and silver and lead; in short, the world is a deceit, a cheat, a humbug and a fraud.

But is this so? Is the world shoddy, padded, veneered and varnished? If so, why? What is the remedy? Is there no profit in genuine material, honest work and truthful results? But, again, we may ask, do not producers make what there is a market for? Does the world want the genuine, honest, pure and unadulterated, or does it want something "just as good"?

While America has all the protection necessary from the foreign cheap and nasty products, she ought to be able to produce the genuine. If our ports were open and free to the floods of imitation trash of the world there might be excuse for trick, deceit and fraud.

But where is the blame? Do the people want to pretend for what they are not, want to appear to live above or out of their honest spheres? Is it not the want of genuine, honest, healthful character on the part of the people which gives market to shoddy?

Suppose it is, but who can tell the difference? My diamond earring just as envy-engendering in paste and plate as my neighbor's in real. We eat and drink and sleep and wear as our inherent honesty of character compels, and a world absorbed in its own affairs takes little heed. If our own standard of manhood and womanhood is satisfied, justice us, then where the blame?

But is anybody deceived? Is it not a reflection upon the intelligence of the American people to say they are deceived or cheated? Are there any who will admit they are so ignorant? Do we buy two dollars' worth for 50 cents? Do we ever believe the representations of sellers? Do we ever believe our eyes, our ears or our noses regarding the purchase of two dollars for 50 cents? The world makes what there is a demand for. Cheap clothes, cheap food, imitation ornaments, cheap railways, cheap tools, cheap gas and cheap steam and electricity, and cheap diamonds—cheap people.—*Chicago Journal of Commerce*.

LIME JUICE AND OIL.—A large quantity of lime juice has been exported from Trinidad in recent years. The simple juice finds a market in America, and the condensed juice in England. A tree yields on an average about ten gallons of juice. The limes are allowed to drop off, and then passed first through the cutter, which rips them open, and next through rollers and a press to separate the juice. These cutters, rollers and press are constructed in a very primitive way, and admit of great improvement. The juice is then exported either as it is or condensed by boiling. A barrel of limes yields seven gallons of juice. The cost of producing lime juice, including packages, should not exceed 12 cents per gallon. The essential oil of limes is extracted from the rind before crushing by grating on rasps with the hands. The oil thus extracted is called band-made oil. A hundred gallons of juice will yield by distillation about three quarts of the essential oil.

CLEANING GAS CHANDELIERS.—The following hints are given in *Modern Light* for cleaning gas chandeliers: It is seldom that gas chandeliers are gilt; they are nearly always lacquered with yellow lacquer and burnished. But whether gilt or lacquered, they may be cleaned thus: Take the chandelier to pieces and boil the pieces for several minutes in a strong lye, then brush them over with a soft brush. Next pass them through a strong solution of cyanide of potassium, which is a deadly poison; then wash the pieces thoroughly in a large vessel of boiling water, dry them in clean sawdust, wipe them dry with a wash leather, and when required, re-lacquer. Finally, refit the parts together.

WASTE OF STEAM IN WHISTLING.—A well-posted railway man says that the obligatory tooting of a locomotive on the New York, New Haven & Hartford railroad, in an ordinary day's run, involves a waste of steam requiring the consumption of 250 pounds of coal to renew. He estimates the whistling expenses of that particular railway at \$15,000 per year. There is a similar waste in the howling of the whistles of stationary and steamboat engines. It is a matter worth the serious study of practical railroad men, whether they cannot devise a cheaper noise with which to give notice of the approach of trains to stations and grade-crossings.

CANNED FISH, MEATS, ETC.—A correspondent in British Columbia, who is engaged in the business, gives the following practical information: I recently opened several cans of salmon that were processed in July of 1879, 1880, 1881, and on comparing them with last season's cans, found it impossible to detect the slightest difference. I hold that if a can is once perfectly sealed, the contents will remain unaltered as long as the metal casing remains intact. A can will keep if every portion of the contents has been subjected to a temperature of 212° Fah., whether the air has been expelled or not.

A NEW NAIL FOR FASTENING ON MOLDINGS.—For attaching moldings and other light lumber, a new kind of nail has been contrived, which leaves no nail-holes. It is made with a point at each end and with an outwardly projecting head or shoulder midway between the points. The nail is first driven into the wood by means of a punch which straddles the protruding point and bears on the head. When enough have been driven in, the molding is placed over the nails and driven down.

PAINT FOR DAMP WALLS.—For painting walls or other objects exposed to damp, a composition is said to be much used in Germany formed of very fine iron filings and linseed oil varnish. When the object to be painted is to undergo frequent changes of temperature, linseed oil and amber varnish are added to the first two coats. This paint may be applied to wood, stone, or iron. In the case of the latter it is not necessary to free it first from rust or oily matters.

PULLEYS AND BELTS.—A belt has been known to refuse to do the work allotted to it, and continue to slip over pulleys two feet in diameter, but from the moment the pulleys were changed to three feet in diameter there was no further trouble. These observed facts seem to be at variance with and to contradict the results of the experiments that have been made.

TO CLEAN CERTAIN KINDS OF JEWELRY.—Any gold jewelry that an immersion in water will not injure, can be beautifully cleaned by shaking it well in a bottle half full of soap-suds to which a little prepared chalk has been added, and afterward rinsing in clear cold water and wiping dry.

LAGER BEER.—The English are far ahead of all other nations in the consumption of beer—in the following proportions: The consumption in Great Britain is 30 gallons per head of the population, in Germany 20 per head, and in the United States only seven gallons.

COLOR-STAIN FOR MARBLE.—A good color-stain for marble may be made of equal parts of zinc sulphate, ammonium chloride, and copper acetate (verdigris), all in fine powder; it must be carefully applied.

TO PREVENT DECAY OF WOOD.—A hot mixture of one-third paraffine and two-thirds gutta-percha, forced into the pores of wood, is winning favor as a means of preventing decay.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

LOYAL LEAD.—*Ledger*, April 16: The parties owning this promising mine in the Black Hills, near Drytown, are negotiating the sale to the Valentine Brothers, of San Francisco, the owners of the Mahoney. The sale was to have been consummated last Monday. The purchase price was in the neighborhood of \$50,000. This property gives every promise of being one of the best paying mines in the county. The present owners, seven or eight in number, who have worked it on a small scale with a ten-stamp mill, have made big wages for four or five years past, and have paid for the mine out of the gold extracted. The development, however, has reached a point when it will be necessary to put up expensive machinery. The Pennsylvania, adjoining the Gover on the south, goes with the Loyal Lead. At the Gover between 25 and 30 men quit one day last week. Their wages were a few months in arrears, although they might have been paid at any time had they so desired. A new underground foreman was placed in charge, and some of the men did not appreciate the energetic manner in which he assumed the duties of the position. A cleanup of the mill was made after a run of ten days, which realized \$2500, and this, with other funds in the hands of the company, was sufficient to pay all the strikers, and they were allowed to go. Their places were promptly filled, and mine and mill are running as smoothly as before. W. Boxall has run his prospect tunnel into Matley's hill, close to Jackson, a distance of 300 feet. The rock has been exceedingly hard. Within the past week, the rock has changed to a much softer character, which is an indication that the ledge matter is not far off. Work was resumed on a small scale at the big tunnel at Middle Bar last week. They are prospecting with hand-drills at present. The five-stamp mill of Spagnoli Brothers, at Clinton, was started Saturday last. They have about 80 tons to crush for testing purposes. The five-stamp mill on the Reed & Askey claim, near Pine Grove, has been running for several days. The crushing consists of 100 tons of quartz, which from all appearance ought to yield from \$12 to \$14 per ton. They expect to clean up early next week. It is reported that the Valentine Brothers have bought a controlling interest in the North Gover for \$25,000. Henry Emerson, who for several months has been cleaning up around the old sulphurets works of the Gwin mine, got through with his job last week. He has shipped 14 tons of sulphurets to San Francisco.

SUTTER CREEK.—*Cor. Amador Ledger*, April 16: Work at the Wildman mine is still progressing favorably. At 50 feet the miners came across a drift 30 feet long. Upon examination they found excellent rock in sight, and by cutting into the footwall a couple of feet they also discovered quartz of good quality. This drift, however, has been timbered up. They are now down 75 feet. The large hydraulic pump is completed and ready to be placed in position.

Calaveras.

FROM MURPHYS.—*Cor. San Andreas Prospect*, April 15: At the Oro Plata shaft of the Red Wing, through which the quartz is being hoisted, is a capacious one and well timbered. Three Burleigh drills are in the level and drifts now being run; two of them are kept in motion day and night. To give one an idea of the capacity of one of these drills in an expert's hand, 50 feet was drilled in one shift. Another point of interest is the milling and concentrating departments. Tustin pulverizers are used for the reduction of the quartz, of which there are four. Below the pulverizers are located the concentrators, two of which are running, doing the work of four formerly used with the old belt, but with the new corrugated belt invented by J. B. Morse of this place, better results are gained with half the expense. A big strike was made in the Central Hill gravel mine of McCormick, Bisbee & Thomas. The bottom is full of gold, ounce nuggets frequently picked up; six ounces was washed out in one pan, and 32 ounces washed out yesterday. Several thousand dollars have been taken out of the mine during the past week without a final cleanup. The strike is important from the fact that it veers to the right, as if seeking an outlet in Six Mile creek. Tom Goodwin, of the Calaveras Co., has returned from the city and intends pumping out the water. The other mines from the Calaveras westward on Indian creek, ending with the Esmeralda mine, are doing fairly, and diligent work is being done. The Esmeralda with its ten-stamp mill made a fine run in the last fortnight, and exceedingly rich quartz is now being extracted. I was shown some very rich quartz taken from the Collier mine recently.

SULPHURETS.—*Angels Echo*, April 6: About 15 tons of sulphurets extracted from the Utica mine in this town was shipped to the Selby Smelting Works at San Francisco during the week. The above amount was the result of a month's run of the budle process, which works like a charm. The mines of Indian Creek district are all making a good showing. The Calaveras mine, which has been closed down for several months, is reported to start up shortly. The Kelly mine is running night and day. About 30 men are employed at this mine. The ore which is now being mined is reported to be of high grade, and an immense cleanup is expected shortly. The Wood mine, though temporarily shut down for repairs, will resume operations in a few days. This is one of the best paying mines in the district. Other smaller claims are being prospected throughout the district, many of which are yielding fair returns.

Fresno.

HILDRETH.—*Iron Gold Miner*, April 15: More new ground has been opened up in the Francis & James mine during the past week and the results have been encouraging to its owners, who will probably develop the property further by sinking the shaft 200 or 300 feet, and crosscutting the pay chute. The ore body in the east drift is continuous, but the extent of the pay chute is still unknown, though the indications are that it may extend 350 or 450 feet each way from the working shaft. Louis Wilson will soon resume work on his property—the Wilson mine. The ore worked through Smith's arastra

gave the most satisfactory returns. Since work was stopped the shaft has filled up with surface water, which can be pumped out in a day, however. The mine is an extension of the Francis-James, and everything indicates that the day is not far distant when the Wilson will be one of the best bullion-producers in the camp. Improvement still continues as depth is attained in the Hildreth mine. The ledge holds its own in size, and the ore seems to be of a better milling quality. The mill will commence work on rock that runs \$80 a ton and contains four per cent of sulphurets. It is said that the Dalhousie is one of the finest prospects in Fresno county. The ledge is 3½ feet wide and prospects 20 cents to the pan. The ore carries three per cent of sulphurets that assay \$280 per ton. Offers have been recently made to the owners of the Rough & Ready, by parties who are willing to put up machinery, etc., for an interest, but their propositions have not been accepted. Sinking will be resumed at once, as well as drifting on the east level. F. Scully informs us that a 3-foot ledge, containing one-third galena sulphurets, has been opened up in shaft No. 2, and in order to develop this part of the mine work has been discontinued for the present in the tunnel. The ore in this mine is similar to that in the Rough & Ready. New locations are being made continually, as the record for this district will show. Many of the new finds are looked upon with favor, which shows that prospectors are being rewarded for their trouble. It is well worth while to walk around Table Mountain to look at Lee & Byrnes' prospect. The ledge is 18 inches wide and from it they take enough ore to keep their arastra running. The ore contains 2½ per cent of sulphurets. The Bonanza is an extension of the Lee & Byrnes prospect, and is owned by Clark & Robinson and promises to repay development. Barney and Harry Clark have been getting out \$75 rock during the last 60 days and will soon have 250 tons on their dump to arastra. The ledge is small but very rich. Riley Armstrong and James Mussel have just returned from a prospecting trip on the Last Chance mining belt. They discovered a fine vein of ore about four miles south of the Last Chance mine. It is in slate formation and five feet between walls, with over two feet of solid quartz that prospects fairly on the surface.

Inyo.

NEW COSO.—*Inyo Independent*, April 16: Mr. Hunt, a representative of San Francisco parties, recently bought a mining claim at New Coso, a few miles from Darwin. A large shipment of goods and supplies for the mine are now at Keeler. As soon as this lot of goods can be hauled to the mine, work will be pushed with vigor. J. C. Eddy is running his mill at old Coso. The run will cover a period of some weeks. J. A. McKenzie is getting out ore right along from the Lucky Jim mine. There is still so much snow in the mountains around Lookout that teams cannot get to the charcoal; this delays starting up the furnace. In the meantime more ore is accumulating at the furnace, and teams are hauling steadily from the mines to Keeler for shipment to San Francisco.

Mono.

ARASTRA.—*Mono County Relief*, April 15: We have been informed that the Cleveland mine, in Jordan district, is producing some very good ore. The arastra and water-wheel have been completed and the arastra is now being run to its fullest capacity, three tons per day, on rock from the mine. It is quite probable that Jordan district will make a stir in the mining world in the near future.

Placer.

FOREST HILL.—*Placer Argus*, April 16: Mr. Ed Boyle, who assumed the contract for running the May Flower tunnel, at Forest Hill, in December last, has given it up. The company now intend running it themselves under the superintendency of Mr. F. Chappell. The pumps will be started up in the shaft next Friday. It was nearly full of water, no work having been done in it for over two weeks. The tunnel will now be vigorously pushed forward to completion, which it is expected will be accomplished in about six months.

Nevada.

NO SALE.—*Foothill Tidings*, April 16: The time for which the Crown Point mine was bonded has lapsed, and the deposit of \$2000 forfeited. Mr. Kelly, the gentleman who had the bond on the property, offered an additional \$2000 for an extension of time to May 1st, but it was refused. It is doubtful if Mr. Gauthier will now sell the mine, as daily developments prove the same to be more and more valuable. Arrangements are being made to obtain a United States patent for the claim. The surface ground has been located and improved by settlers, and Mr. Gauthier is giving deeds therefor to them.

THE CENTENNIAL.—*Grass Valley Union*, April 17: The Centennial Gravel Mining Co., of Washington Township, will soon resume operations after suspension during the winter months. The machinery will be driven by water-power. The shaft is 300 feet in depth, with seven feet of gravel at the bottom, and when work was stopped the bedrock had not been reached.

BRUNSWICK MINE.—*Grass Valley Union*, April 13: The Brunswick Gold Mining Company is the name of the new incorporation which has purchased the East Eureka mine (generally called the O'Connor) which is on Union Hill, and east of the Idaho mine, being on the same vein system. The company was organized in the city of New York a few months ago, with a capital stock of \$2,000,000. The trustees are A. A. B. Kellogg, Cornelius Corson, Geo. H. McAdams, Henry D. Murray, Francis H. Grove of New York, W. B. Price of St. Louis, John J. Collier of Louisville, Albert P. Brayton of San Francisco, and George Fletcher of Grass Valley, all prominent in business circles in their respective communities. Since the organization of the company subscriptions to the stock have been taken to raise a fund to pay for the property and to create a working capital, and this having been accomplished to an extent to justify the commencement of operations, there will now be no unnecessary delay in starting work. The 20-stamp mill on the property is in good shape, and can be put to crushing ore as soon as it can be supplied. It is in contemplation to sink a new shaft on the pay chute, the location of which is now definitely determined, but in the meanwhile the mill will probably be kept running on the ore that can be taken out of the drifts and slopes already opened. George Fletcher, as resident director, will have the management of the mine,

and will at once proceed to getting things in shape for regular work. The Brunswick mine is regarded with much favor by the miners of the district.

DELHI.—*North San Juan Times*, April 16: The Delhi mine is away up. It is yielding rock that mills over \$100 to the ton. The ledge is very rich and all the rock taken from it is run through the mill. Candle-boxes full of specimens are taken from the mine in which quartz is the exception, gold predominating. The Delhi is to the Ridge where the Idaho has been to Grass Valley. The Delhi is a bonanza.

San Bernardino.

DAGGETT NOTES.—*Cor. Los Angeles Herald*, April 16: The 60-stamp mill now in course of erection for the Oro Grande M. and M. Co. will be ready to drop stamps on ore from the Waterloo mine by September 1st. The Runover mill, owned by the Garfield Mining Company, is kept constantly running in rich ores from the Garfield and other rich mines owned by the company. The Barber mill, ten stamps, keeps pounding away night and day upon custom ore furnished by chloriders, turning out a constant stream of bullion. The Odessa mill at Hawleys has put on a larger force of men and will commence running on full time shortly. Waterman & Porter's mill at Waterman has shut down for the time being. From what I can learn it is not for lack of ore. The Alvord mine near Camp Cady has shut down, but the mill will be kept in operation crushing some 200 or 300 tons of ore on the dump. The mines at Ord Mountain, which are gold and copper, are looking remarkably well. A party left here during the week for the Soda Lake base metal mines. They have an idea of putting up reduction works in that vicinity. Five stamps have been added to the 5-stamp mill at Mesal, and the mill started up last Friday, one week ago. Rich ground has been lately struck in the mine owned by Bahten Bros., Kerr & Patton, at Providence, silver ore assaying up in the thousands with a goodly quantity of gold intermixed having lately been discovered. It is rumored that the old Bonanza mine, which has in former times yielded so much precious metal, will soon resume operations. Occasional rich strikes of good ore are reported along the line of the railroad.

Santa Cruz.

BLACK SAND DEPOSITS.—*Santa Cruz Sentinel*, April 16: P. Leonard has disposed of a half interest in the black sand deposits on his ranch at San Andreas to a San Francisco party, and a company to work the deposits on an extensive scale will probably be organized before long. An engine and pump will be placed in position next week for the purpose of increasing the supply of water from one inch to three inches. The deposits are about a mile from the beach and half a mile from the railroad station. Mr. Leonard owns 200 acres of land at San Andreas, of which 60 acres have been tested and show that the sand is from four to eight feet in thickness, and averaging from \$2 to \$7 per ton. The sand is about 40 feet below the surface, and to work it a main tunnel 300 feet in length has been run, and from it smaller tunnels branch off. At present 50 tons of sand per day are being taken out, yielding from \$1 to \$5 a ton. "Three men," says Mr. Leonard, "can easily take out 300 tons of sand a day, from which \$100 can be made clear of all expenses. An analysis has shown that of what remains after the gold is extracted 80 per cent is iron." Mr. Leonard intimated that the establishment of iron works on the ranch for the purpose of utilizing the iron after the gold is extracted is among the probabilities.

Shasta.

LOWER SPRINGS.—*Shasta Courier*, April 16: Lower Springs district is flourishing. The Captain Atkins, Calahan & Co. mill, situated on Salt creek, 2½ miles from Shasta, is running on good pay quartz from S. H. White's White Oak mine. The company has a roaster in operation, and will soon have up chlorination works. S. H. White has bonded the White Oak mine for \$10,000 to Baker & Gage, and they are sinking a 100-foot shaft. They are down 45 feet in good pay rock. S. H. White is also sinking a shaft on the Eastern Star, and will go down 100 feet. The quartz prospects fine. White has stuck to the Lower Springs mines with great tenacity, and is in a fair way to reap a rich reward for perseverance.

FRENCH GULCH.—The mine of M. and C. S. Plumb and Charley Webb has about the best exhibit for the work this side of the ridge. It has 80 feet of tunnel, with a 5-foot lode to fall back on. They will probably start up their arastra in eight days; situation on left-hand fork of French gulch.

BONDED.—The Scherer Tellurium mine, near the Middle Creek depot, is bonded for \$50,000, and work is going on, with what result we are not informed.

BEING DEVELOPED.—Wm. T. Coleman has a force of 10 men at work on the mining ground he purchased a year ago, this side of Dr. Dingee's place. A boarding-house and sleeping apartments have been built, and the mine will be developed with all the speed that energy and capital can utilize. We understand that work will be resumed on an extension of the Coleman claim.

GO.—*Cor. Shasta Courier*, April 16: Work has been resumed on the Dayton, J. P. Wright's arastra is running on ore from his new find. It is paying well. The Manzanita is turning out its usual grade of ore, and E. L. Ballou's arastra is running on the same. Shirland & Hubbard are running their arastra on ore from their Creighton ledge. Mine looking well. Hardscrabble is using a full head of water. The brush dam being built to hold back the debris is so far doing its duty. Campbell & Co., now at the Chicago, have been doing some prospect work at the Crystal, and are much pleased with the outlook. Wm. Lee is doing some development work on his claim near the Crystal. Capt. Atkins, and others interested, have been here the past week, looking out a favorable site for a Russell furnace.

Sierra.

MILL.—*Sierra Tribune*: It is the intention of the owners to erect a Forbes mill at the Calico quartz mine this season. From all accounts, that mine will pay to work. It is situated on the Middle Yuba, about three miles above the Savage placer mine. Good prospects have recently been encountered in the old Wheeler quartz mine at Downville. The principal owners of the property reside in the East, and they have been informed of the strike. The Cleveland mine is yielding very good returns under the management of A. W. Crowell. The last cleanup amounted to \$3400. The Alaska

mine at Pike City is working 100 men, and is paying as well as ever.

TO RESUME OPERATIONS.—A *Tribune* reporter met one of the representatives of the Gold Valley Empire quartz mine in Downville last week, and was informed that active operations would be resumed in that quarter in a short time. They expect to employ about 200 men there this summer, and will erect extensive smelting works and all necessary adjuncts thereto. The mine was sufficiently opened last season to warrant the owners in carrying out their plans as laid down when the present company organized. The mine is connected with Sierra City by a good wagon road, and if we mistake not from the information at hand this town will reap great benefits from the work to be carried on there.

INCORPORATED.—The Forest King quartz mine, located in Gold Valley district, was incorporated recently under the name of the Parker Mining and Milling Company, J. D. Fagg, H. H. Robinson, W. E. Parker, M. Lenaban, and Jerry Dooley were elected directors, and T. F. Batelle, secretary. The business office is at Loyalton. From a gentleman who was down from the mine yesterday, we are informed that work is progressing favorably there. The new boarding-house has been completed, and active work is going on underground. There is about seven feet of snow still remaining in the vicinity of the mine.

Siskiyou.

SCOTT BAR.—*Yreka Union*, April 16: The Quartz Hill Company struck a good prospect in their claim this week. A. Milne is working in his claim on Hetchel hill.

HYDRAULIC.—Hon. R. H. Campbell has 12 men at work in his hydraulic claim at Quartz valley, and will increase the force largely at the end of the month.

Trinity.

THE BROWN BEAR.—*Journal*, April 16: From Mr. Henry Martin, superintendent of the Brown Bear mine, who was in town this week, we learn that quartz is looking well in that vicinity, and everything about the mill running smoothly. Mr. Martin is now running a tunnel 4½ feet wide by 6½ feet high, into the west hill to cut the extension of the Brown Bear. He started the tunnel the middle of last January and expects to cut the ledge in two months more.

MINE BONDED.—We are informed that Fred Groteland, of Redding, and another gentleman have bonded the Big Bonanza mine, at Minersville, for a San Francisco company, for \$30,000, the company having until the 10th of May to put up the coin.

Tuolumne.

POCKET.—*Tuolumne Independent*, April 16: Robert Watson & Co. took out a nice pocket from their quartz claim, at Brown's Flat, on Saturday, and a smaller one since.

Ventura.

THE NEW CAMP.—*Cor. Ventura Free Press*, April 15: The Ventura people cannot realize what a rich mineral belt there is in the northeastern portion of this county, and the mines will not receive much support from them. This district is too near home for them to realize and have full confidence in its richness. This district includes a mineral belt at least 20 miles square, with much of it yet to be prospected. In this belt there is about ten miles square of placer ground that will average three cents to the pan. Nuggets have been found worth from \$5 to \$100. The placer ground is spotted and much of it lies in the old river-bed above the present channel. We are informed by a placer miner who has lived in that section for some time that a man can pan out from \$1 to \$10 per day. About 50 prospectors are in camp, and many more are scattered in the mountains. A grocery store has been started in camp, and stock for three other stores is on the way and miners are continually coming in. The ledges of this district are uniform and have the appearance of being permanent ones, whether at the base or on the summit of the mountains. There is an abundance of wood and water, and there seems to be no reason why this will not prove one of the richest discoveries and one of the largest mining camps on the Pacific Coast. It is estimated that in a comparatively short time the mineral resources of this county will far exceed the agricultural resources, and we doubt not that this will be verified. Capital is what is needed in the camp, and that will soon come. We would advise no one to go there at present with the expectation of obtaining employment, as work has not fairly begun, though several parties are at work on their claims. In going from Ventura by wagon, the trip can be made in three days. Take the stage road and turn off three or four miles this side of Newhall, up the San Franciscoquito canyon, to Elizabeth Lake; thence to Gorman's Station; thence to John F. Cuddy's, and ten miles further to Lexington. By trail: Take the Matijia trail to Mart Beckman's, and next day to Lexington via Samuel Snedden's; or take the Nordhoff trail to Mutaw's ranch, and five miles further to Lexington. From Santa Maria, take the Cuyama wagon-road to Treats; thence to Beckman's and Lexington. From Bakersfield—60 miles—take wagon-road to J. F. Cuddy's. From Lancaster, take wagon-road to Gorman's Station.

NEVADA.

Washoe Enterprise.

OCCIDENTAL.—*Virginia Enterprise*, April 16: Extracted six tons of milling ore from the 100 level. No. 3 east crosscut have begun cutting out a station preparatory to sinking an incline winze. From the station on the 100 level of the north incline winze the south drift was extended 10 feet; total length, 66 feet. The north drift was extended 14 feet; total length, 61 feet. Both of these drifts are following a narrow streak of milling ore.

CON. CALIFORNIA AND VIRGINIA.—South drift No. 2 from east crosscut No. 1 was advanced 15 feet; total length, 127 feet. This drift still continues to show fair-grade ore. On the 1400 level raise No. 2 was carried up 12 feet; total length, 97 feet. It continues to show ore of an average quality. The usual amount of ore was extracted and sent to the mills. The pulp assays average about the same as last week.

BALTIMORE.—Good headway is being made in cleaning out the main drift on the 300 level. Once the drift is in order, a raise will be made from it to

the 225 level. The raise will follow the course of the vein. On the 400 level, the old drifts are being cleaned out and put in shape for prospecting. There is much new ground to explore on this level. On the 300 level, the drift which some time ago cut into the vein is being allowed to drain out.

HALE AND NORCROSS.—On the 1300 level the main south drift was yesterday expected to connect with the old Chollar incline. At noon it was thought that the drift had yet about five feet to go. The material is of a very favorable appearance. The south drift on the fifth station level has been extended and timbered 24 feet.

GOULD AND CURRY.—On the 425 level the south-west drift from the main south drift was advanced 15 feet; total length, 135 feet. The face is in hard porphyry. On the sixth floor, the upraise, 42 feet above the track floor, is in quartz, some of which shows milling value.

IOWA.—The shaft from surface to connect with north tunnel is sinking in good ore, also upraise from same tunnel to connect with shaft is following ledge up in fine ore. Other parts of the mine unchanged since last report. The ledge in which the rich gold rock is being prospected is crossing east and west, and is distant from northwest patent corner of Ophir about 1000 feet.

CROWN POINT.—Sufficient ore is being extracted to keep the mills in operation, and a full force of miners is gradually being put into the mine. The main shaft is now in excellent condition, and all is working well and smoothly. The ore extracted is being worked at the Mexican mill, which regularly works 130 tons a day.

YELLOW JACKET.—About 160 tons of ore are daily being extracted and sent to the mills. Most of this ore is being taken out on the 1300 and 1400 levels. Above these levels a good deal of prospecting work is being done, and a considerable amount of ore is being found in the old upper levels.

BELCHER.—Are extracting and shipping about 100 tons of ore a day. This ore is being reduced at the Santiago and Vivian mills. The force of miners is gradually being increased. There is in sight a large amount of ore that will pay a good profit.

CHOLLAR.—Ore is being regularly hoisted at the Sharon shaft on the croppings. They are now about ready to start a drift from the 400 station of the old shaft to connect with the bottom of the Sharon shaft in the old workings.

MEXICAN AND UNION CON.—On the 1300 level the joint Union and Mexican drift running north-easterly is now 455 feet in Mexican ground. The joint Mexican and Ophir east crosscut was extended 25 feet; total length, 357 feet.

HAYWOOD.—The Haywood has been purchased by the original owners. A large amount of ore is in sight on both the 100 and 200 levels and the Briggs and Thompson mills are kept steadily running on ore from the mine.

BULLION.—The east drift on the 200 level is still in vein porphyry, with some streaks of clay and occasional strings of quartz. The station at the 300 level is about completed.

SCORPION.—The east drift on the 300 level has been advanced 30 feet during the week. The face is still in a mixture of quartz, clay and porphyry. No water is encountered.

UTAH.—On the 472 level the north drift from the main west drift was extended 45 feet; total length, 505 feet. The face is still passing through vein porphyry and quartz.

OPHIR.—On the 1300 level the northeast drift was extended 20 feet; total length, 210 feet. Are cutting out a station in the north drift for winze to be designated as No. 1.

OVERMAN.—The usual amount of ore is being extracted from the level of the old Petaluma-street tunnel. The ore is of high grade, but pays very well for working.

SIERRA NEVADA.—On the 520 level west crosscut No. 8, from the south lateral drift No. 2, was extended 45 feet; total length, 213 feet. The face is in porphyry.

BEST AND BELCHER.—On the 1500 level east crosscut No. 1 has passed through a hard porphyry streak and entered soft porphyry, mixed with a little clay.

JUSTICE.—The usual amount of ore is being extracted on the 250 and 310 levels to the course of prospecting operations.

ANDES.—Prospecting on the 200 and 300 levels and extracting the usual amount of ore, which is being saved for working.

ALPHA AND EXCHEQUER.—The work of sinking the shaft below the 120 level is progressing favorably.

OEST.—The new whim works well, and a large amount of good milling ore is being hoisted.

VIVIAN.—A considerable amount of good milling ore is being extracted.

Cherry Creek District.

EXCHEQUER MINE SOLD.—White Pine News, April 16: From a gentleman just in from Cherry creek, we learn that Fred Frank and a man from Salt Lake have purchased the Exchequer mine and mill at Cherry creek from Murdoch & Cahoon. Mr. Frank and partner now own the two best mines and mills in that district, and the showing in both mines is such that they feel confident of keeping the two mills running all summer. This is good news for Cherry.

Hawthorne District.

GOLD.—Esmeralda News, April 16: Last week Arthur George, Syl. Light and Phil. Bowers shipped to the Reno Reduction Works three tons of gold ore from the Pamlico mine in Hawthorne district, 2½ tons of which netted the boys \$3000, the remaining half-ton being worth \$600. This result is the product of six weeks' work. There are other mines in the district from which, with proper management, a like result might be obtained. The mine was leased to the boys, not because it was then considered valuable, for it was not, but with the hope of discovering something rich. It is such men that bring out a camp, and not the Micawbers who sit around holding on to mines and expecting some one to come along and pay them a fancy price for their claims.

Jackrabbit District.

THE ONONDAGA.—Pioche Record, April 14: The Onondaga mine is looking well. From its inception this mine, which is in limestone, has differed from

every prospect or mine ever struck in the limestone district of Jackrabbit. All others have been a series of pockets, alternately opening and pinching down to the usual knife-blade iron seam to follow, through money and hard lucks, or abandon through sheer discouragement and consequent distrust of the treacherous formation. From the first shot put into the Onondaga, this mine has not shown the least sign of "pinching," but has held its own nobly, gradually improving in both quantity and quality of the ore streak, varying from one to three feet in thickness, showing up a true fissure, with well-developed hanging and foot-wall, as work progressed. Shipment after shipment of Onondaga ore has been made, netting its owners a fair profit. At this writing, the winze being put down from the tunnel level is 65 feet deep, and the average assay of the ore is \$114.65 silver, the percentage of lead being high.

YUBA.—The work of retimbering the shaft of the Yuba mine will be commenced in a day or two, preparatory to starting up mining operations in that mine. On the ninth level of the Yuba there is said to be a large body of lead ore, containing nothing refractory in regard to smelting. Years ago some very good ore was extracted from the Yuba. In those days the demand was for free milling ores—lead ore was at a discount. The milling ore of the Yuba pinched out the lead coming in, the mine was shut down, and eventually the shaft timbering below the second level rotted and tumbled down the shaft, filling it with debris. The estimated cost of refitting the mine is somewhere about \$10,000. Mr. Sam Godbe is to assume control.

Sprucemont District.

THE CAMP.—White Pine News, April 16: Ho, for Sprucemont! seems to be the slogan of the surplus population of Taylor. A loaded team went out Wednesday for the new camp. It is the general belief that 150 men will find employment there this summer. Ben Miller has secured the contract for hauling the ore from the mines to the furnace.

Taylor District.

SHUT DOWN.—White Pine News, April 16: The Argus mill was shut down yesterday, owing to lack of ore, the teams being unable to keep up with the stamps. About a week's headway will be given the teams.

Wild Rose District.

CONCENTRATED ORE.—Silver State, April 16: One of the Paradise Valley Co.'s teams arrived yesterday with 16,000 pounds of concentrated ore. This morning E. Reinhart & Co. shipped 32,000 pounds of concentrated ore to Argo, Colorado.

Willow Creek District.

ARASTRAS.—Cor. Silver State, April 14: Mining matters are about as usual. Faith in the district still remains unshaken. Choate Bros. have set their arastras in motion. Crushing commenced yesterday, and the machinery is said to be moving along smoothly and doing effective work.

ARIZONA.

AROUND PRESCOTT.—Courier, April 16: The St. Louis Yavapai M. and M. Co., of this county, is making regular shipments of silver to St. Louis. Mill is working tailings of Tiptop mine. The company is opening up a good mine on the crosscut. Mr. J. M. Threxton will soon erect a 20-stamp mill for Diamond Joe, in Bradshaw district. The Gray Eagle, one of the richest and largest gold mines in the county, will shortly change hands. The output of water is being taken advantage of by placer miners, and considerable gold dust is the result. There is a rumor to the effect that a Mr. Nichols has been offered \$100,000 for a gold ledge recently discovered by him in Weaver district. Mr. Douglass, mining expert, was here recently, examining the United Verde. W. W. Davis, of Hassayampa, and John Hughes, of Turkey creek, like all miners, think that the era of bullion production has come to stay. Mr. Abel, of Bradshaw, tells of great activity in his section. Mr. Douglass Gray came in yesterday from Agua Fria, where several good leads are being developed.

AROUND PRESCOTT.—Courier, April 9: B. T. Riggs and John Lawler came back to town Thursday from their mines in Santa Maria district. They have had ore from these mines tested and are satisfied. They are wet ores, just such as will be in demand when a general smelter shall be set at work here. J. A. Park, who, besides being a good, practical miner, is a first-class assayer, has gone back to his properties in Hassayampa district. He, too, has a mine that is wealthy in silver and lead. Mr. F. M. Murphy, who has devoted money, time and attention to making known the mineral resources of Arizona, returned recently from a tour of the mines, and tells of the many tons of rich ores he saw on dumps, ready to be shipped to the Prescott sampling works, which will be running in 10 or 12 days. Wm. Jennings is credited with owning a very rich silver mine in Hassayampa district, and we are sorry he is not working it. Mr. John S. Jones will soon start active operations in Groom Creek district. He has strong Eastern backing, but will go slow until he learns just what kind of process is required to get the metals from the ores. We have lived in this section since 1864, have done some mining, witnessed and heard of many failures, but have never lost faith in the mines, and are, to-day, pleased with ourself for having "stayed with" the interest, which is now fast becoming the leading one of this section. Miners, too, are every day opening new treasure stores and do not, as formerly, grumble at "the country." We mean miners who own mines and work them.

IDAHO.

TREASURE BOX BULLION.—Murray Record, April 14: To-day the Treasure Box company had a 62-oz. gold bar run at the Excelsior assay office; value about \$1023. This is the result of 10 tons of quartz and is only a partial cleanup, the bed of the arastra not being taken out. It is well known that by crushing ore in an arastra the amalgam works down in the crevices of the rock bed in the tub, which is only removed and a thorough cleanup made when the bed is worn out. At this rate their ore is enormously rich.

SEVEN DEVILS' MINING DISTRICT.—This mining district is situated in the northwest portion of Washington county, Idaho, about 75 miles from Weiser City, and is accessible by roads and trails up the Weiser valley. The district was discovered by Levi

Allen, of Boise, I. T. J. J. Lewis, of Wood River, and the ex-Governor of Montana are interested with Allen in several locations. These and other leads have been considerably developed, some showing large bodies of ore. Assays have been made showing from 45 to 60 per cent copper, from 16 to 20 ounces of silver and from \$8 to \$12 of gold per ton. The elevation of the camp is between 5000 and 6000 feet. About 30 men have been pushing work during the past winter, and lively times are anticipated this summer. The Union Pacific Company has had an engineer corps in the field surveying northward from Weiser City. The ultimate purpose of this road is to tap the North Idaho country.

YANKEE FORK.—Cor. Challis Messenger, April 14: The mining interests of the camp are not lagging. Wm. McQueen, of Salt Lake City, took charge of the Dickens mine some weeks ago; the Norton Hill has taken on new life. There are 12 to 15 men employed; the mine has been drained and works carried down the vein into new ore, rich in both silver and gold. The old ledge, or original Dickens, has at present a large vein of rich ore, while the small or south vein also shows fine ore.

THE WASHINGTON.—Mr. Morrison, on the Washington, west of the Dickens, has been running and sinking 90 rich ore, all winter. He has now, at the least estimate of miners, over \$150,000 worth of ore in sight—some put it at \$200,000. He is sinking in the lower tunnel, and has about one foot of \$1000 ore—same quality as in the upper tunnel. Six to eight men are employed.

THE CUSTER MILL.—The Custer mill runs along as usual, producing a goodly quantity of silver and gold bullion. Myron Crafts is an experienced metallurgist and practical millman. Dan Murphy has charge of the company's mines.

SHEEP MOUNTAIN.—Messrs. Barber, Brown, and Evan Jones are in the Sheep Mountain country. The mines are looking well, according to last reports. It is expected Sheep Mountain will have a boom this season. The mines are rich and easily opened.

STANLEY BASIN.—A number of placer miners have already gone to Stanley basin, and others will follow soon. The Muloch placer ground, on Joe's gulch, has opened out very rich this winter. Mr. Muloch has a pay streak 15 feet wide which prospects 15 to 30 cents per pan. He recently rocked out four ounces in one day by way of prospecting the pay streak. Everything taken together, it looks now as though the west end of Custer county will make quite an advance in development and prosperity this season.

MONTANA.

WEST OF ANACONDA.—Review, April 16: The work in and about Silver Lake has commenced in earnest, and though the snow is not fully gone enough for general prospecting, there are bare spots on which those familiar with that district and have had their ground marked are now at work. The stage out of Anaconda is loaded each day with passengers going to the richest mineral-bearing belt in Montana, that from Anaconda west to Phillipsburg. A greater portion of those going out into the hills now start for Silver Lake and Georgetown. The oldest mining men in the Territory all say that they are as confident that the mineral belt west of Anaconda is as promising as any in the Territory, and that all it lacks is to be thoroughly prospected. At Georgetown the Pyrenees is still running and some important developments have been made. It has been generally understood for some time past that Eastern parties were negotiating for this mine for a sum, said to be about \$200,000, but as yet the sale is not consummated. There are a number of other claims in the immediate vicinity of Georgetown which are attracting considerable attention, prominent among which are the Dardanelles and the Luxemburg, in both of which Saltoo Cameron has considerable interest. The Grubstake, which is located about two miles northwest of Georgetown, is the mine for which the company was incorporated to work last winter. The work of developing this property on an extensive scale will be commenced at an early day. At Silver Lake the Congdon boys are hard at work on the Silver Reef, taking out ore and piling it up on the dump. They expect to commence shipping ore as soon as the roads will permit hauling to Anaconda. This mine was bonded last season to parties at Salt Lake, but they failed to materialize and the boys now have it, and from present indications they are not the losers by the failure of the parties to take up the bond. In Oleson gulch, Sawtelle & Co. are working on their Silver Chain mine and taking out a small amount of ore. The bad roads render the hauling to Anaconda and shipping an impossibility. Wm. Seebe and Mr. Gunn have discovered a very valuable gold lead in another quarter of Oleson gulch, which promises to be something good. Sawtelle is said to have another even more valuable property than the Silver Chain. In the Blue-Eyed Nellie district every portion of the hill is staked out in claims, all parts of which are said to be fully equal if not superior to the original location. It is known that there are now at least three mines on this hill, the Nellie, the Boomerang, and the Katie Darling. The Nellie is known to us all. The Boomerang has received notice at our hands several times, and is proving to be all that was claimed for it. The Katie Darling is the latest addition to the valuable properties on Carbonate hill, and it bids fair to compete with the Nellie. There is but one claim between it and the Blue-eyed Nellie, and the ore was found the same as at that mine, at the grass roots. We were shown this week a number of specimens from this prospect, which are exactly similar to the Nellie's. A shaft is being sunk on it and we expect to hear any day that the main ore body has been reached. A number of parties pronounced it the most valuable prospect west of Anaconda.

BUTTE.—Inter-Mountain, April 16: Very cheerful is the mining outlook for Butte just now. The big companies are not making much noise, but there is a great deal of work going on and more men employed than ever before. The Anaconda is producing tremendously and seems to be making a desperate effort to offset the low prices by a wholesale output. The other copper producers are maintaining their splendid record and are intelligently using past experience in the direction of a necessary curtailment of expenses. They are now mining, hoisting and treating ore at a less rate per ton than at

any previous time in the history of the camp. The best news of the week is the declared intention of the Bluebird to add 20 more stamps to its 70-stamp mill. There is plenty of motive power, sufficient room and abundant ore to justify the proposed increase. With 90 stamps in operation the company will not only have the biggest dry-crushing, chloridizing mill in the United States, but the biggest in the world. Mr. Van Zandt is also authority for the statement that a second mill to contain 40 stamps will also be erected in the near future for Bluebird ores. A good deal of quiet work is being done on other well-known silver mines. On the Amy and Silversmith the shaft is being sunk from the 400-foot station to a depth of 500 feet. On the floor of the 400-foot level on the middle vein the ore was rich and compact, and there is every reason to believe that the new level when opened up will fully maintain the reputation of the property. It is probable that the other veins traversing the claim will be crosscut and exploited. On the Orphan Girl also the shaft is being sunk and the quality and extent of the shoot in the upper levels give reason to hope for important developments below. The Cora, Acquisition, Gagnon, Burlington and other properties frequently mentioned in our local columns are all in an active state of development, and are daily adding to the royal record of the greatest mining camp of the age.

NEW MEXICO.

HERMOSA.—Black Range, April 14: The carload of ore from the Palomas Chief, 12 tons, returned 157 ounces silver and 6.2 per cent lead. It was treated at the Graphic smelter at Socorro. The work on the Atlantic Cable still progresses and continues to show good ore. A drift has been driven easterly on the contact a distance of about 30 feet, besides the driving of the adit into the bowels of Treasure Hill. Roberts & Guthrie have finished their contract on the Embolite mine, and the ore is sacked and piled on the dump ready for transportation. On the Pelican, Vulture, Albawoss and Eagle group of claims there are 22 men at work, the ground having been parceled out to leasers, who are always ready to take the ground of these valuable properties. Mr. Marshall has developed a fine showing of ore in the south drift at the 50-foot level on his Humming Bird mine. There is also a fine showing in the several adits to the west of the shaft.

OREGON.

CLEANUP.—Jacksonville Times, April 16: Another cleanup was made at Wm. Bybee's claim near Waldo recently, which realized a few hundred dollars. The rains of the past ten days have increased the water supply considerably, which will prolong the mining season. Brown Bros., who are engaged in mining in Wm. Bybee's claim on Rogue river, have done good work this season. Wm. Coker of the California M. Co. has returned to Krbville and work will be renewed with vigor on the ditch between Sucker creek and Illinois river. Mr. Sterling, of Polk county, is in the vicinity of Rogue river, searching for what is popularly known as the Boulder ledge. Some excitement exists in the Briggs' Creek mining district, Josephine county, a large portion of which has been taken up again. Good prospects have been struck. John Chambers and Miller Maury, who have been mining on Louse creek, Josephine county, finished a good run not long since. They have since sold out at a fair figure. Wm. Hamlin has struck excellent prospects on the mining ground he purchased of C. C. Beckman, near Grant's Pass, some time since. Jas. Ferren and son and N. Thoss are engaged in mining some first-class ground in the Silver Creek section. Mr. Reeve, who is engaged in mining on the Klamath river near Happy Camp, made a cleanup of \$28,000 after a 14 days' run, besides cleaning up \$3500 a short time before.

UTAH.

PARK NOTES.—Park Record, April 16: Prof. J. E. Clayton, who recently examined the Ontario mine, in speaking of the future prospects of this great property, in his report which will soon be published, says: "The new ground west of No. 3 has been explored by extending the 600-foot level to the west end line, a distance of 2800 feet. The 1000-foot level is now in about 1000 feet west of the shaft and is in one of the largest ore quites ever found in the mine. Taken as a whole, the mine never looked more promising than it does now. Notwithstanding the great cost of opening and draining this mine, it has paid large dividends to its shareholders, and will, no doubt, continue to pay its usual dividends for many years to come." Last Friday week the Crescent miners broke into the Boss workings, put the latter's men to flight and took possession of the disputed ground. The ground in dispute is said to be very valuable, being extensively mineral bearing. F. W. Hayt, manager of the Southern Tier group, is down from an inspection of the late strike in the mine. The vein encountered in the lower tunnel averages nearly two feet in width, and some exceedingly fine-looking rock has been taken from the ledge. Assays of average samples of the new find run from 2000 to over 4000 ounces, samples of what may be considered as third-class dirt going as high as 180 ounces, with a fair percentage of lead. This good news permanently settles the fate of Snake Creek district, for although prospecting has not been extensively carried on, enough has been done to prove the continuance of the Southern Tier veins for at least three miles, the croppings at many of the claims carrying enough of the precious metals to pay for shipping. The Daly mine is in a very prosperous condition, and is fast making a record equal to its twin sister, the Ontario, for being a rich producer and big dividend-payer. Four new Frue vanners are in operation at the Crescent concentrator. The present fine weather is drying up the roads, and from now on ore shipments will be increased.

ORE AND BULLION SHIPMENTS.—For the week just ended, the Mackintosh sampler received 205.120 pounds of Ontario ore. The Marsac mill shipped on the 14th inst. seven bars of Daly bullion, containing 7500 fine silver ounces. The shipment to-morrow will be six silver bars. On the 9th, the Ontario shipped 37 bars of bullion, containing 20,414 fine ounces of silver. The Crescent shipped during the week the first new lot of concentrates, aggregating 434,023 pounds, to Denver. A 20-ton lot of first-class ore was also shipped to Salt Lake,

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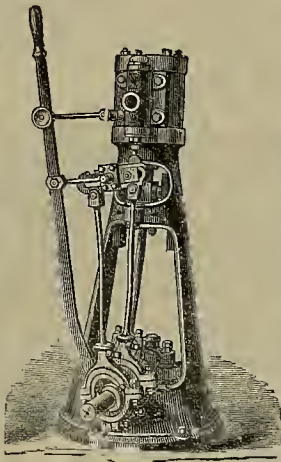
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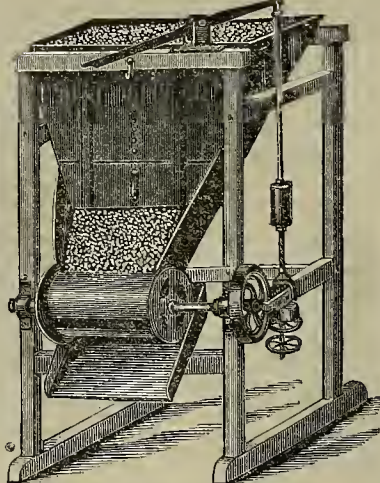
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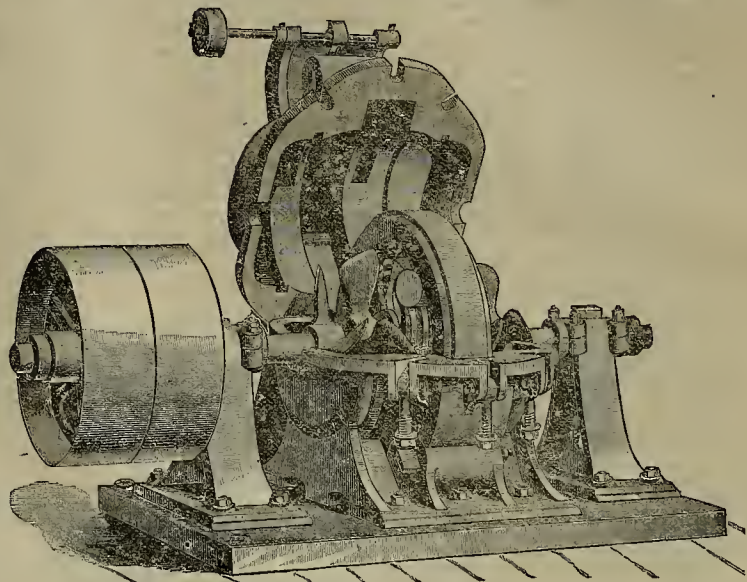
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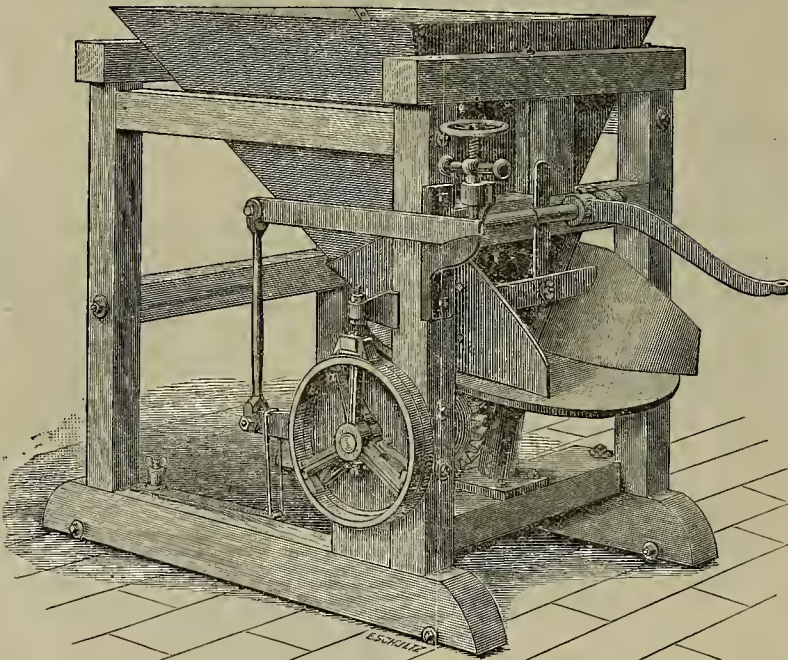
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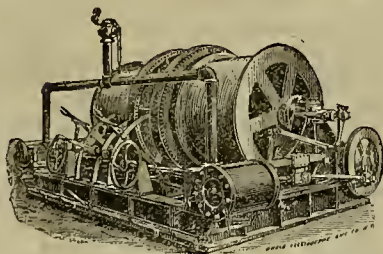
A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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FOR WEEK ENDING APRIL 12, 1887.

361,126.—GRAIN DRIER—Borland & Parsons, S. F.
 361,205.—BEET PULLER—R. R. Burrows, Potter Valley, Cal.
 361,133.—SMOKE CONSUMING FURNACE—C. C. Carter, S. F.
 361,134.—CHINESE LANTERNS—Lam T. Chu, S. F.
 361,064.—STOVE—Francis Jackson, Oakland, Cal.
 361,076.—WHEEL AND AXLE—J. Pettinger, Santa Barbara, Cal.
 391,183.—KEY FASTENER—F. Reiser, Eugene City, Ogn.
 360,930.—MINING CAR—J. M. Thompson, S. F.
 14,281.—TRADEMARK—J. F. Nolan, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Mining Share Market.

Affairs in the mining stock market are quiet, fluctuations being slight. Up on the Comstock at the middle mines they will now soon be ready to do a good deal of crosscutting. The main south drift on the 1300 level of the Chollar, when connected with the main incline will give a fine circulation of air, and will open up a large area of ground in which cross-cuts may be made. Much good ore is being shown up in the Savage, and were there milling facilities large shipments of bullion would be seen.

When mills are put up great activity will be seen in Pototsi and all the middle mines. There will be new life in all that section. Now little is being done in the Pototsi. All the drifts and openings in the lower levels are filled with ore, and nothing more can be done until there is a chance to mill this ore.

At Gold Hill all is again getting into good working shape at the Crown Point and Belcher. There is in sight a large amount of ore, and it can be taken out as fast as there are facilities for its reduction.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Bluebird, April 13, \$33,440; Alice, 13, \$25,000; Hanauer, 13, \$17,000; Bannock, 13, \$27,500; Alice, 14, \$8,651; Hanauer, 14, \$33,500; Lexington, 15, \$44,480; Bluebird, 15, \$32,443; Moulton, 13, \$15,664; Silver Bow, 15, \$21,728. Last week Wells, Fargo & Co. shipped from Salt Lake in bullion \$49,631; McCormick & Co., \$54,110; T. R. Jones & Co., \$11,480; Union Bank, \$20,355.

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WATER FOR THE COMSTOCK.—The new line of flume to convey water from Martell lake to the Comstock, to be used as a motor for driving stamps for crushing ore, will strike the east line of Mount Davidson 34 feet above the grade of the old line. The stream flowing through the flume will have a volume of 100 miners' inches. The pressure of this volume, falling through a pipe at the level of the collar of the Combination shaft, will be 186 pounds to the square inch. It is proposed to increase this pressure to nearly or quite 1000 pounds to the square inch by dropping the water through a pipe on a 60 inch Luffa turbine wheel placed on the Suto tunnel level of the shaft, 1640 feet below the surface. This will give a fall of 2000 feet from the flume. This power will be transmitted back to the Combination shaft and to the stamp-mill to be built on the surface below the Coollar shaft. By steel-wire battery this pressure will furnish motive power sufficient to drive 250 stamps.

A BIG CONTRACT.—Secretary Whitney has awarded to the Bethlehem Iron Works Company of Pennsylvania the contracts for furnishing about 14,000 tons of steel gun forgings and 4500 tons of steel armor plate at a total cost of \$4,512,938. Its bid, though not the lowest for gun steel, was the lowest in the aggregate for the two contracts.

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Baker Divide M Co.	California.	13.	25.	Mar 19.	Apr 15.	May 9.	D. M. Kent.....	330 Pine St
Best & Belcher M Co.	Nevada.	35.	50.	Mar 5.	Apr 15.	May 5.	J. L. Oshorn.....	309 Montgomery St
Bodie Tunnel M Co.	California.	14.	25.	Mar 2.	Apr 27.	May 20.	C. O. Harvey.....	309 California St
Caledonia M Co.	Nevada.	42.	1.	Apr 1.	Apr 5.	Apr 26.	A. S. Goeth.....	414 California St
Comstock M Co.	Nevada.	3.	15.	Mar 14.	Apr 13.	May 15.	A. B. Ball.....	309 California St
Con Washoe M Co.	Nevada.	2.	19.	Mar 24.	Apr 28.	May 14.	P. M. Ewen.....	314 Montgomery St
Confidence S M Co.	Nevada.	14.	50.	Apr 7.	May 12.	June 2.	A. S. Groth.....	414 California St
Dolores Con M Co.	Nevada.	4.	05.	Mar 2.	Apr 11.	Apr 29.	R. N. Van Brunt.....	318 Pine St
Europa M Co.	Nevada.	9.	25.	Apr 5.	May 12.	June 7.	J. Morizio.....	328 Montgomery St
Florida M Co.	California.	1.	15.	Mar 16.	Apr 18.	May 7.	T. J. Mitchell.....	Grass Valley
Gover Improvement Co.	California.	2.	10.	Feb 28.	Apr 26.	May 26.	R. N. Van Brunt.....	3 Pine St
Gould & Curry S M Co.	Nevada.	65.	50.	Mar 8.	Apr 11.	May 4.	A. K. Durbow.....	309 Montgomery St
Hale & Norcross M Co.	Nevada.	93.	50.	Mar 9.	Apr 14.	May 4.	J. F. Lightner.....	339 Montgomery St
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Julia Con M Co.	Nevada.	22.	15.	Apr 13.	May 2.	June 16.	J. Stadfield.....	419 California St
Laverton M Co.	California.	1.	05.	Mar 8.	Apr 12.	May 2.	J. M. Desa.....	339 Montgomery St
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Riochili M Co.	California.	3.	50.	Mar 10.	Apr 12.	May 2.	F. B. Holmes.....	309 Montgomery St
Savage M Co.	Nevada.	61.	2.	Feb 17.	Mar 30.	Apr 23.	H. P. Bush.....	431 California St
Sierra Iron Co.	California.	6.	25.	Apr 13.	May 13.	June 6.	E. S. Parker.....	379 Montgomery St
Sierra Nevada S M Co.	Nevada.	88.	25.	Mar 31.	May 6.	May 26.	J. M. Buffington.....	329 California St
Utah Con M Co.	Nevada.	33.	20.	Apr 6.	May 9.	May 26.	A. H. Fisa.....	309 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Con Amador Volcanic Hyd G M Co.	Cal.	M. Casey.....	16 Montgomery Ave.	Annual.....May 4
Russell Reduction & M Co.	Cal.	J. Morizio.....	328 Montgomery St.	Annual.....Apr 30

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada.	A. W. Havens.....	309 Montgomery St.	50.	Apr 7
Original Hidden Treasure.	Nevada.	D. A. Jennings.....	401 California St.	13.	Apr 7
Plymouth Con M Co.	Nevada.	J. J. Seaville.....	329 Montgomery St.	25.	Apr 7
Pacific Borax, Salt & Soda Co.	Cal.	F. H. Clough.....	431 California St.	10.	Apr 7
Paradise Valley M Co.	Nevada.	W. Letts Oliver.....	328 Montgomery St.	10.	Apr 15
Silver King M Co.	Arizona.	J. Nash.....	328 Montgomery St.	25.	Apr 15

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING MAR. 31.	WEEK ENDING APR. 7.	WEEK ENDING APR. 14.	WEEK ENDING APR. 21.
Alpha.....	3.25	4.00	3.25	3.75
Alta.....	1.90	2.20	1.95	2.40
Andes.....	95	1.15	1.00	1.30
Argenta.....	15	45	15	10
Belcher.....	2.30	2.85	2.30	2.55
Best & Belcher.....	6.00	6.35	5.25	6.10
Bullion.....	1.95	2.30	1.20	2.95
Baltimore.....	75	80	75	75
Belle Isle.....	70	75	60	70
Bodie Con.....	2.25	2.70	2.2	2.10
Benton.....	60	65	60	75
Bodie Tunnel.....	1.20	1.30	1.20	1.15
Bulwer.....	123	125	132	125
Challenge.....	2.00	2.50	2.15	2.25
Champion.....	5.00	5.50	5.75	6.35
Chollar.....	6.00	5.50	5.75	6.35
Confidence.....	9.00	9.25	9.00	8.00
Con. Imperia.....	1.50	1.40	1.30	1.25
Caledonia.....	1.40	1.45	1.35	1.45
Con. Pacific.....	2.00	2.15	2.25	2.50
Crown Point.....	3.50	3.80	3.70	4.25
Crocker.....	30	35	30	35
Dudley.....	75	80	75	75
East B. & B.....	1.25	1.30	1.25	1.30
Eureka Con.....	1.25	1.45	1.30	1.45
Exchequer.....	1.25	1.45	1.30	1.45
Grand Prize.....	3.25	4.30	3.15	4.15
Gould & Curry.....	3.50	4.40	4.30	5.00
Hale & Norcross.....	3.50	4.40	4.30	5.00
Holmes.....	2.75	3.00	2.75	3.00
Independence.....	75	1.00	75	1.10
Iowa.....	40	45	35	40
Julia.....	1.40	1.45	1.35	1.40
Justice.....	1.40	1.45	1.35	1.40
Kentuck.....	1.25	1.25	1.10	1.15
Lady Wash.....	32	45	45	50
Martin White.....	1.00	1.00	1.00	1.00
Mono.....	2.00	2.15	1.80	2.00
Mexican.....	4.05	4.20	3.65	4.40
Mt. Diablo.....	4.00	4.00	4.00	4.00
Nevada Belle.....	1.15	1.20	1.10	1.10
Nevado.....	6.75	8.00	6.75	7.00
North Belle Isle.....	6.75	8.00	6.75	7.00
Ningra.....	2.30	3.30	2.25	2.30
Nav. Queen.....	3.00	3.50	3.00	3.50
North B. & C.....	3.00	3.50	3.00	3.50
Occidental.....	6.00	6.00	6.00	6.00
Ophir.....	1.30	1.60	1.40	1.50
Overman.....	1.30	1.60	1.40	1.50
Potosi.....	3.25	3.50	3.25	3.50
Peerless.....	40	75	35	75
Per.....	40	75	35	75
P. Sheridan.....	1.00	1.05	1.05	1.05
Silver Star.....	5.25	5.75	5.00	5.50
Savage.....	5.00	5.50	5.50	5.50
Sechell.....	3.00	4.00	3.75	3.75
Sierra Nevada.....	3.00	4.00	3.75	3.75
Silver Hill.....	30	30	35	30
Silver King.....	9.00	9.00	9.00	9.00
Snyder.....	60	80	60	80
Syndicate.....	2.70	3.25	2.50	3.00
Union Con.....	1.60	1.20	1.20	1.20
Uta.....	1.75	1.75	1.40	1.40
Yellow Jacket.....	3.75	4.75	4.00	4.00

Sales at San Francisco Stock Exchange.

THURSDAY APR. 21, 1887.	390	Exchequer.....	2.00
800 Alta.....	2.75	Gould & Curry.....	4.40
1700 Andes.....	1.90	Hale & Nor.....	5.35
100 Atlantic.....	45	Iowa.....	30.95
1500 Argenta.....	20	Julia.....	5.00
50 Alpha.....	4.25	600 Justice.....	5.00
100 B. & Belcher.....	7.00	76 Lady Wash.....	60.00
450 Bullion.....	2.60	430 Mexican.....	4.90
200 Benton.....	1.00	200 Navajo.....	1.30
800 Belcher.....	4.00	500 Overman.....	1.50
100 Belle Isle.....	850	300 Potosi.....	8.00
100 Bulwer.....	1.15	100 Peerless.....	650
250 Bodie Con.....	2.10	150 Savage.....	6.25
500 Chollar.....	1.15	500 Utah.....	1.70
250 Con Va & Cal.....	130	50 Scorpion.....	750
1270 Crown Point.....	5.50	100 Syndicate.....	200
200 Crocker.....	85	150 Union Con.....	3.20
100 Central.....	60	50 Utah.....	1.70
200 California.....	65	500 Yellow Jacket.....	3.45
100 Confidence.....	8.50		

BACK NUMBERS WANTED.—In order to complete certain files of the MINING AND SCIENTIFIC PRESS, we should be glad to get certain back numbers. Any one having any of the following numbers of the PRESS will please communicate with this office:

1869—Jan. 24, 29th, 16th, Feb. 27th, March 20th, April 17th, 24th, May 1st, June 12th, 19th, 26th.
 1876—Sept. 11th.
 1886—July to December.

IN searching for water near the town of San Luis Obispo, a bed of coal has been discovered. The extent of the deposit is not yet determined. The coal find is near the proposed Southern Pacific railroad line.

New York Metal Market.

Telegraphic advices dated April 21st give the following New York prices:

BAR SILVER—95½@95½ per oz.
 BORAX—54½@54½.
 COPPER—LAKES—\$10.40.
 IRON—No. 1, \$22.00.
 LEAD—\$4.30@4.36.
 QUICKSILVER—63½@64.
 The following is the latest by mail from the "New York Metal Exchange Market Report":
 COPPER—Dull, spot closing at \$10.30@10.46. Transferable Notices (Lake) issued at \$10.35@—, Transferable Notices (Chili Bars) issued at \$9.17½.
 LEAD—Dull at \$4.30@4.40 spot. Transferable Notices issued at \$4.30.
 TIN—Quiet at \$22.45@22.50. Transferable notices issued at \$22.60.
 Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' prices, closing at \$10.35@10.46. Transferable Notices (Lake) issued at \$10.35@—, Transferable Notices (Chili Bars) issued at \$9.17½.
 LEAD—Dull at \$4.30@4.40 spot. Transferable Notices issued at \$4.30.
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 LEAD—Dull at \$4.30@4.40 spot. Transferable Notices issued at \$4.30.
 TIN—Quiet at \$22.45@22.50. Transferable notices issued at \$22.60.

MARKERS' PRICES.—At tidewater. 100 ton lots of listed Irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$21.00@21.50; No. 2, \$20.00@21.00; Bessemer, \$17.50@19.00; Hudson River, Grade No. 1, \$21.00@21.50; No. 2, \$20.00@21.00; Grey Forge, \$17.50@19.00; Southern, Grade No. 1, \$21.00@22.00; No. 2, \$20.00@—; Grey Forge, —@—.

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, April 21, 1887.

ANTIMONY—French Star.....	94 @
BORAX—San Bernardino.....	71 @ 8
ARMAGAS.....	— @ 6
IRON—Glengarnock ton.....	— @ 27 00
Eglington ton.....	— @ 25 50
American Soft, No. 1 ton.....	— @ 23 00
Oregon Pig ton.....	21 00 @ 23 00
Clippage Gap, Nos. 1 & 4.....	22 00 @ 23 50
Clay Lane White.....	22 50 @
Shotts, No. 1.....	23 00 @
COPPER.....	20 @
Bolt.....	18 @
Sheathing.....	12 @ 13
Ingot.....	— @ 20
Fire Box Sheet.....	4 75 @ 5 00
LEAD—Pig.....	6 00 @ 6 50
Bar.....	5 @
Sheet.....	5 @
Shot, discount 10% on 500 bag Drop, 8 bag.....	1 65 @
Buck, 8 bag.....	1 25 @
Chilled do.....	2 05 @
QUICKSILVER—By the lb.....	40 00 @
Flasks, new.....	1 05 @
Flasks, old.....	85 @
Steel—English, lb.....	14 @ 15
Sheet, 3x3, 7x10 lb, the cask.....	4 @ 5
Plov.....	4 @ 5
Machinery.....	6 @ 6
Sanderson Bros.....	10 @
ZINC—German.....	8 @ 9
Sheet, 3x3, 7x10 lb, the cask.....	4 90 @ 4 95
TINPLATE—Coke.....	6 25 @
Charcoal.....	6 25 @

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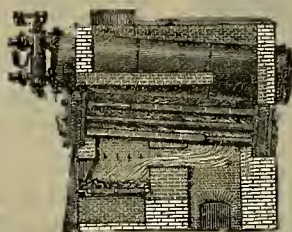
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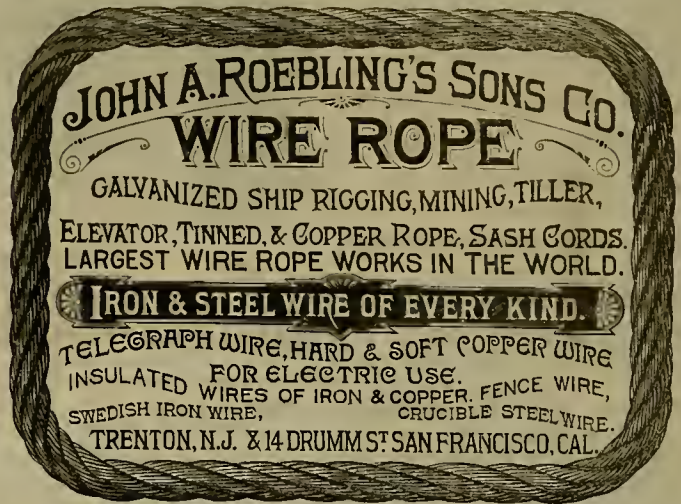
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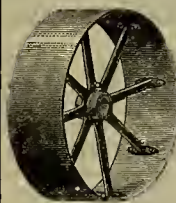
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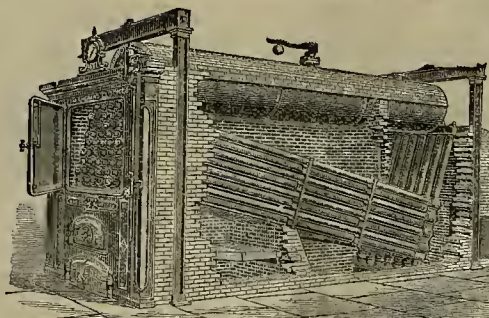
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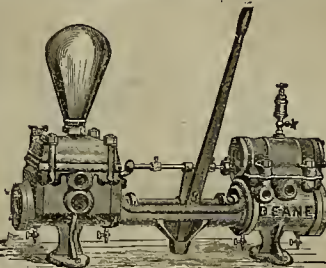
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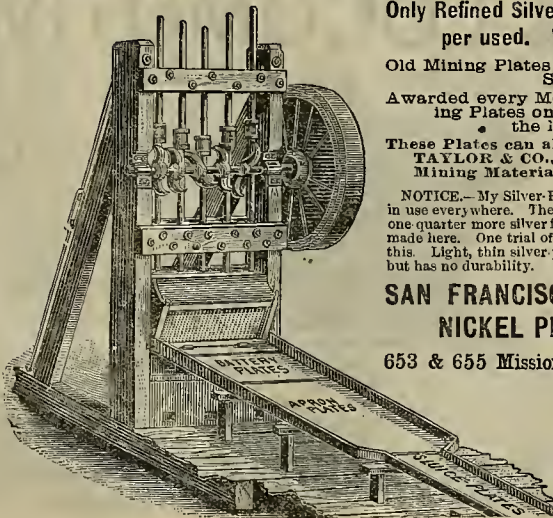
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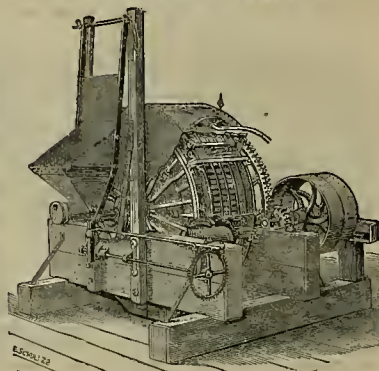
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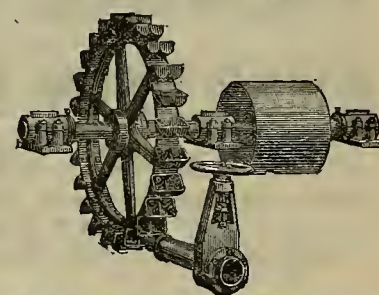
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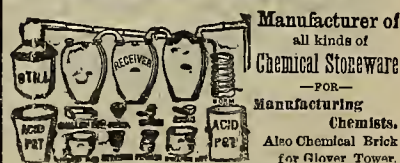
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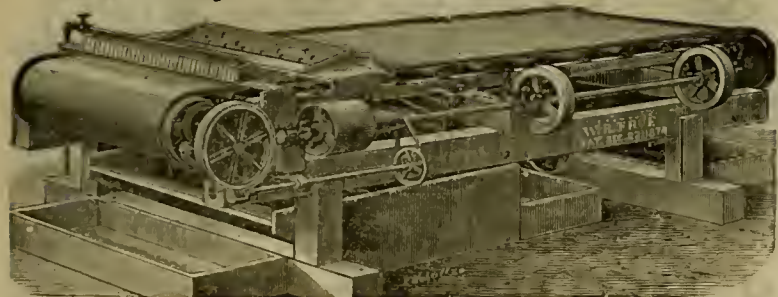
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OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

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DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

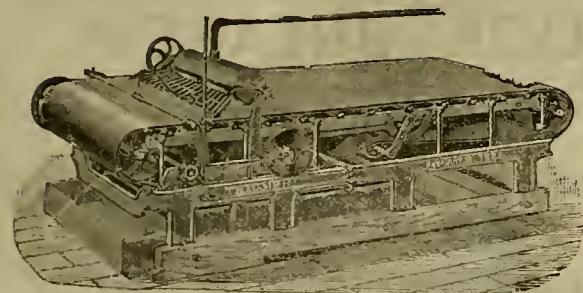
THE MONTANA COMPANY (Limited).
N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.
ADAMS & CARTER.

Protected by patents May 4, 1880; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

THE FRUE ORE CONCENTRATOR OR VANNING MACHINE.

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\$1,000 CHALLENGE ACCEPTED, PRICE, FIVE HUNDRED AND FIFTY DOLLARS (\$550.00).



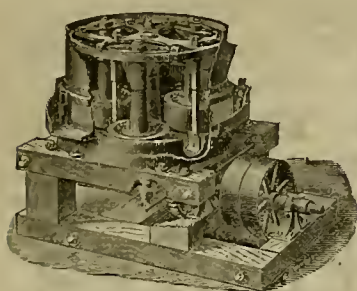
THE "TRIUMPH" ORE CONCENTRATOR.

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE, placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

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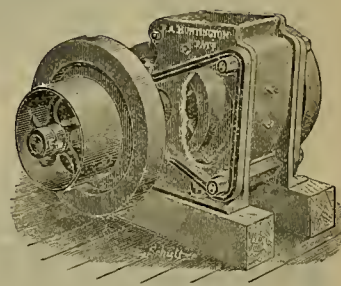
Centrifugal Roller Quartz Mills, CONCENTRATORS AND ORE CRUSHERS,

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TRY OUR MAKE, CHEAPEST AND BEST IN USE.

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SUCCESSORS TO PRESCOTT, SCOTT & CO.

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GUTENBERGER'S ROLLER ORE CRUSHER.

Crush 8 to 10 Tons per Day.

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WEIGHT, 4 TONS.

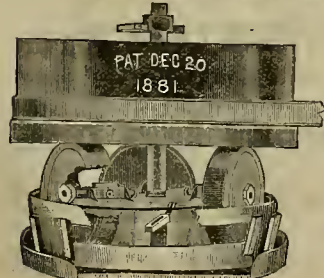
It is a full fledged Quartz Mill without gearings, coars or pulleys.

Power applied direct. Works Ore at Low Cost
More or less weight on Crushers as desired.

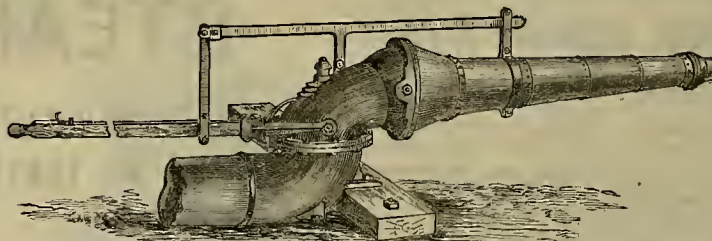
Very little friction. Beats other machines in reducing and amalgamating ore, and costs less. All who have used this mill recommend it highly. Splendid for low-grade ore on account of low cost of working.

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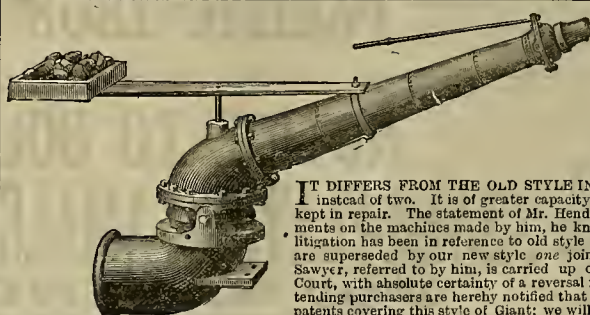


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The above cut illustrates the **IMPROVED FORM OF HYDRAULIC GIANTS**, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et al.

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IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Miners and intending purchasers are hereby notified that we are the sole owners of the patents covering this style of Giant; we will prosecute to the fullest extent of the law manufacturers or users of an infringement.

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Established 1858.

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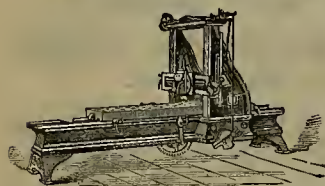
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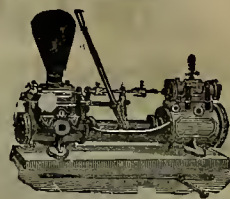


Putnam Planer.

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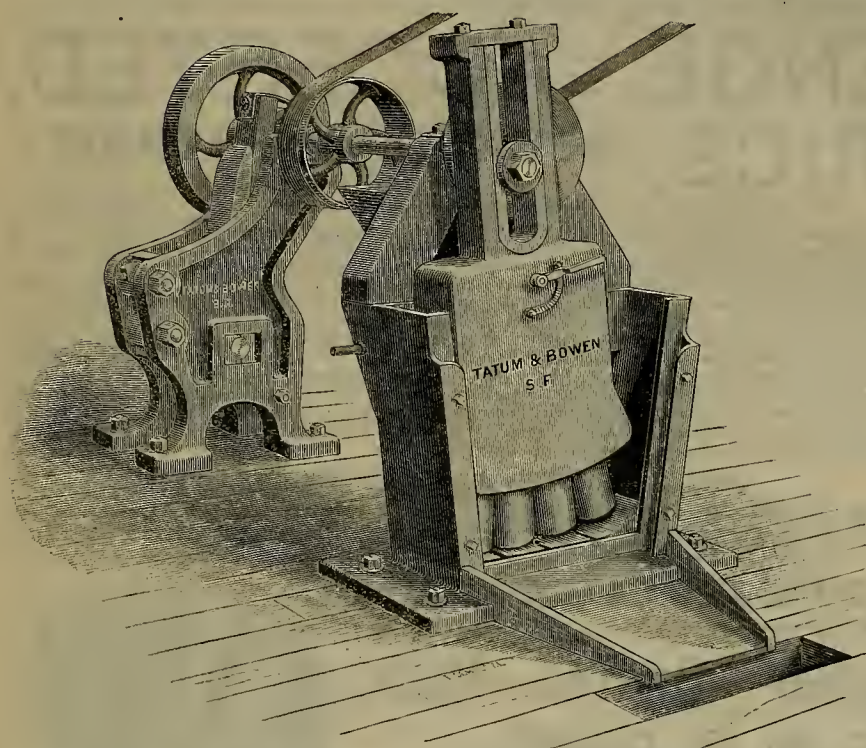
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Knowles Steam Pump
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James Patent Economic Quartz Mill, ROCK BREAKER

—AND—
AUTOMATIC ORE FEEDER.

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DOUBLE and TRIPLE MILLS,
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SINGLE MILL, Shoes drop 1200 per minute.
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PRICES:
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PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

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DESTINED TO REVOLUTIONIZE ALL FORMER METHODS. A SAVING IN FUEL OF AT LEAST 25 PER CENT GUARANTEED OVER ANY OTHER STYLE OF BOILER.

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IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.
FULL WEIGHT OF SILVER AND BEST QUALITY OF WORK GUARANTEED.
GET OUR PRICES BEFORE ORDERING ELSEWHERE. SAMPLES FURNISHED ON APPLICATION.
SAN FRANCISCO NOVELTY AND PLATING WORKS,
No. 108 FIRST STREET.

NOTICE.—All our plates are guaranteed to have the full weight of silver agreed upon, and are tested before leaving our works, thereby avoiding the complaint about light weight, made so often before we started in this branch of industry.

JUSTINIAN CAIRE, Agent,
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—MANUFACTURER OF—
BATTERY SCREENS AND WIRE CLOTH.
Agent for HOSKINS' HYDRO-CARBON ASSAY FURNACES.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, APRIL 30, 1887.

VOLUME LIV
Number 18.

Bad Policy as Well as Bad Morality.

There is a class of miners in this State who, when seeking to dispose of their claims or to induce parties to go and examine them, are in the habit of greatly exaggerating the amount of work done and the ore developments made thereon. Now, these being facts easily susceptible of verification or disproval, the mine-owner should be careful not to grossly misrepresent them at the outset. He may ask an extravagant price for his property if so it suit him, but this being largely mere matter of opinion, may not serve to greatly damage it in the estimation of the expert, however much the valuation of the latter may differ from that of the owner.

The miner may talk with comparative safety about the big ore assays and the big haulion returns he has been able to obtain, because, here again, the expert cannot readily convict him of error unless there be a glaringly wide departure from the truth. But when it comes to describing the length of a shaft, drift or tunnel, the amount of ore developed or probably stopped out, the thickness, composition and other features of the vein, so far as exposed, and to such other matters as can readily be determined or approximated, it will be seen how important it is that the mine-owner should in his prior statements keep within the bounds of reality. These being much exceeded, the expert arriving on the ground and finding he has been badly deceived, naturally distrusts all else that has been told him, and being so prejudiced against the property at the start is apt to condemn it without making a fair examination of its merits, or perhaps any examination at all.

Any misleading statement made by the miner with a view to selling or procuring an examination to be made of his claim is impolitic and wrong; impolitic because it is almost sure to react to his prejudice, and wrong because it leads parties to expend time and money which they would not have done had only the simple truth been told. Such procedure is, to say the least, a blunder, which in a business point of view is almost as bad as a crime. What is untruthful, is, in fact, very apt to prove unprofitable.

We have had our attention called of late to a number of cases of the kind here complained of. The sufferers in some of these cases have been parties from the East, who, after employing and paying experts to examine mines only to find that the statements made in regard to them were essentially wrong, have concluded to invest their means in other directions. While the practice here commented upon is not exactly a crying evil, it is, nevertheless, one that might as well meet with early correction, seeing it results in considerable inconvenience and loss to some, while it can be of no possible benefit to any. We suggest that the claim seller draw it a little milder at the beginning. A course marked by bad policy as well as bad morality ought not to be continued.

GEOLOGICAL EXPLORATIONS IN BRITISH COLUMBIA.—An exploring expedition has been organized by the Canadian Government, for a geological and topographical survey. The expedition will be conducted by Dr. George M. Dawson and William Ogilvie and will extend its operations along the Stickeen river, along the Pacific Coast to the head of Chilcoot inlet, and survey the Yukon river as far as the 140th meridian.

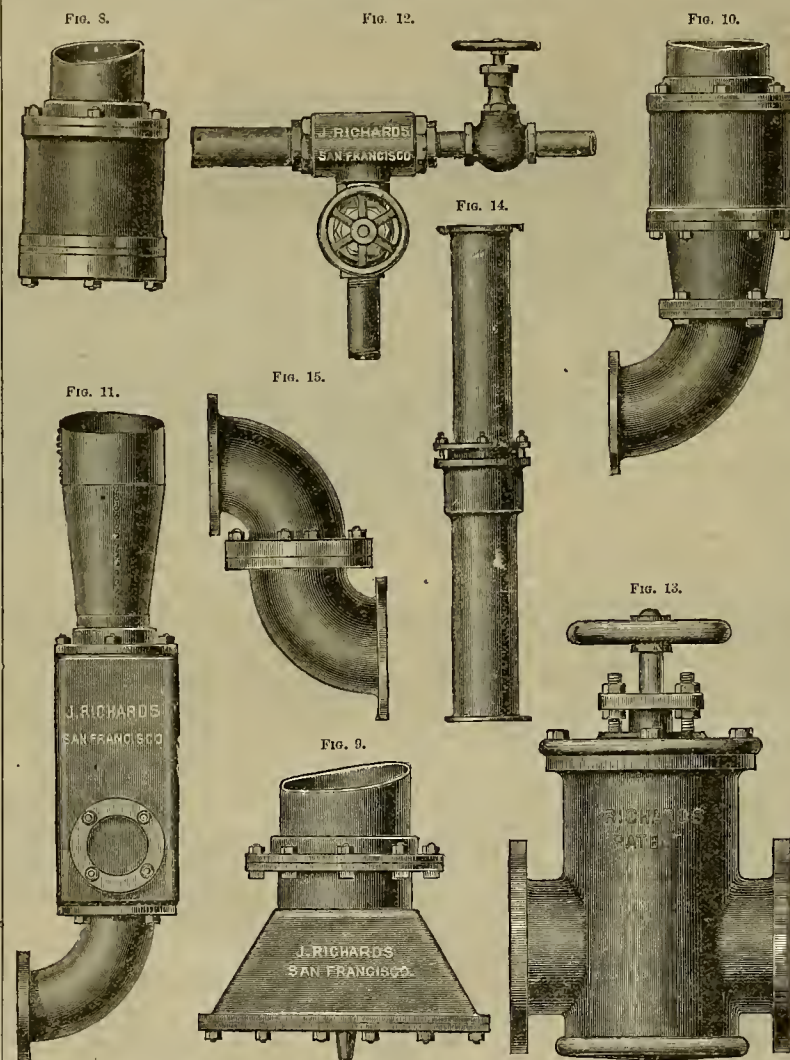
Richards' Patent Hydraulic Machinery.

NUMBER 5—Concluded.

In the accompanying engravings, Figs. 8 to 10 show the various kinds of valves employed with Mr. Richards' irrigating and draining machinery. These valves are the result of a thorough experience in this kind of fittings and have constructive and other advantages over forms hitherto in use—among other things

tion pipes. It is of the full way type, the bore being closed by an elastic split cylinder that cannot be jammed fast, and which is held close by the water pressure from either side. These valves are of simple and cheap construction and being in all part cylindrical in form, can be made light and still withstand a high pressure.

Fig. 14 represents a sliding joint employed in suction pipes for sinking, pumping sand and so on; and Fig. 15, a service joint, such as is



RICHARDS' IMPROVED VALVES, EJECTOR AND PIPE JOINTS.

free and direct water-ways with ample area and straight course.

The one, Fig. 10, is for heads to 30 feet to be placed above the pump, while the one, Fig. 11, is for heads to 100 feet high. The rectangular form is to give a degree of elasticity and prevent breaking the pumps in case the air vessel should become filled with water and fail to perform its office.

Fig. 12 shows a steam ejector for charging pumps. These are made wholly of brass to prevent corrosion and are constructed with nozzles and throats to eject air instead of water. Three sizes are made, suitable for pumps of various kinds.

Fig. 13 shows a stop valve recently patented by Mr. Richards, intended especially for irriga-

tion pipes. It is of the full way type, the bore being closed by an elastic split cylinder that cannot be jammed fast, and which is held close by the water pressure from either side. These valves are of simple and cheap construction and being in all part cylindrical in form, can be made light and still withstand a high pressure.

Fig. 14 represents a sliding joint employed in suction pipes for sinking, pumping sand and so on; and Fig. 15, a service joint, such as is

used in pumping over the banks of streams, or, in other cases when the position of pipes has to be adjusted, the pumps remaining fixed. In some cases the service joints can be made on the pump, the construction before described permitting this.

Field Work by the Mining Bureau.

Most important field work is shortly to be done under the direction of the State Mineralogist. Among other things, the principal gold lodes or veins in the State are to be carefully examined, and the true condition of the gold in the quartz, pyritic matter, specular iron, talcose slate and other gangues or matrices accurately solved. Particular attention will be given to the investigation of the occurrence of "pay shoots" and "pay pipes" in the different lodes, and the character of the inclosing rocks following the inclination of the pay shoots, and those going down with the pay pipes will be determined both macroscopically and microscopically. By so doing, it is hoped that a simple guide or pointer may be furnished to the miner to direct his operations. Many very different rocks present the same appearance to the naked eye, but when sections are cut from them and placed under the microscope, their true character is plainly to be seen.

The great importance of these investigations cannot be overrated, in proof of which it may be said, that had the Eureka Company understood the pay shoot matter they would have been some millions of dollars richer instead of allowing the Idaho Company to have it.

Arrangements are also being made in the direction of a careful examination of the coal, petroleum, and natural gas supply of California. Mr. W. A. Goodyear, formerly of the State Geological survey, has been employed to make investigations of these latter subjects, and will shortly take the field to gather information for the State Mineralogist's report.

Electric Motors in San Francisco.

The use of electricity for power is gradually coming into favor. For certain purposes it is much better than steam, since the motors themselves occupy little room and are clean and noiseless. There is much to be done with electricity for railroad use before it is as perfect as is desired; but for small motors in cities, there are many things to commend it. The Electric Power and Light Company, of this city, is now engaged in perfecting arrangements for power circuits, by which motors will be furnished for running presses, sewing machines, elevators, etc. Some of this work is already being done, but the system is to be widely extended and perfected.

The San Francisco Tool Company, on Stevenson street, has put up one of Prof. N. S. Keith's dynamos in its establishment, and run it by a small independent single-acting engine. From this dynamo wires can be run to electric motors in the vicinity, and power thus furnished. One of the Keith electric motors, connected with this dynamo, has been put in at the Leak Glove Manufactory on Market street. It is a six-horse power motor and is intended to run 75 sewing machines, in use in the factory. The motor is set at one side of the room and takes up no more space than a couple of joints of stovepipe laid side by side. The motor is noiseless and there is no smoke, smell, steam, grease, dust, or any other annoyance. The company is very much pleased with the new source of power and is willing to show the little machine to any one interested. More of these motors will doubtless be placed in other factories in the neighborhood. It is very simple to put them in, and all that is needed is a wire to the main dynamo.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Dogmatism in Science.

EDITORS PRESS:—In the excellent article from Dr. Stillman's book, "The Horse in Motion," inserted in your issue of April 16th, there occurs a pertinent paragraph relating to scientific subjects. He says: "In all ages there has been a tendency on the part of the masses to follow some leader whom they desired to do their thinking for them; to pin their faith to his, or what they supposed to be his. It is no less so in the scientific circles than in the religious. Dogmatism seems to be leaving the latter and attaching itself to the former." In regard to the latter clause of the paragraph just quoted, Dr. Stillman is, I think, mistaken. There is no evidence of any recent relative change in that respect as between religion and science. In former times scientists have been no less dogmatic than religionists. Copernicus, in deference to the scientific dogmatism of his day, withheld from public enunciation for 30 years his deductions in astronomy which formed the basis of what is now known as the Copernican system; and when his successor Galileo established the correctness of the Copernican principles by incontrovertible demonstrations, the scientists invoked the power of the church to put him down; and for half a century after Newton had discovered and demonstrated the principle of gravitation, the mathematicians persisted in their efforts to discredit it.

Dr. Stillman says: "All science, in whatever department of knowledge, is retarded much by the ignorance and zeal of the multitude who follow on the heels of genius." * * * Itinerant lecturers perambulate the towns as representatives of learning they do not possess, and put forth as proved truth the wildest speculations of enthusiasm and call them science."

Dr. Stillman does the "ignorant multitude and the itinerant town lecturer" a wrong in attributing to them exclusively the evil practice which he specifies. Sir William Thompson is now a noted scientist, much quoted both in this country and England. The London Philosophical Society, figuratively speaking, may be regarded as a scientific assembly around which all other similar bodies revolve in respectfully distant orbits. A few years since this same scientist, assuming that what is known as the Darwinian system of evolution was proven true, in a paper read before that self-same society, advanced the idea that the living germ with which the Darwinian system of evolution necessarily made a beginning had been carried to the earth in a meteoric stone. Such a proposition is not less absurd than the ancient Hindoo idea of the earth resting upon and being sustained by a huge tortoise. Astronomers estimate that meteorites, in numbers by the million, are deposited on the earth annually. Neither Thompson nor his scientific auditors seemed to consider that if one germ had come in that way no plausible reason could be assigned why they should not have come in countless numbers, and of infinitely various species, and thus obviate any necessity for an evolutionary production of species; for every individual organism here on earth at this time has the beginning of its growth in a germ invisible and entirely incomprehensible to the human mind.

JUSTIN CHENOWETH.

French Industrial Prizes.

Among the prizes offered for 1887 by the French *Société d'Encouragement* for discoveries and inventions of value to French industry, the following have been quoted in the Continental press. Prizes of \$200 each: 1. For the utilization of residue in factories. 2. For the discovery of a new alloy for industrial purposes. 3. For the industrial utilization of a cheap and abundant mineral substance. 4. For the useful application of metals which have hitherto been only used to a limited extent for industrial purposes. 5. For the construction of a heating appliance to produce, in small industrial workshops, elevated temperatures by a quick and economical method.

Prizes of \$400 each: 1. For a small motor for workshops, acting for itself or in connection with a larger factory. 2. For suitable improvements in the mechanical spinning of flax. 3. For improvements in the usual form of grain-mills. 4. For a motor for heavy oils. 5. For the economical production of ozone, and its application.

Prizes of \$600 each: 1. For a mode of transmitting natural mechanical forces over long distances when their immediate utilization is impossible. 2. For the manufacture of glasses for chemical purposes. 3. For the manufacture of fine stoneware. 4. For the construction of a simple and solid appliance which will indicate the progress of a train at any distance in a reliable, automatic and regular manner. 5. For the construction of an appliance which will indicate, at a distant point, the temperature of a heated room. It is stated that models, etc., must be sent to the secretary of the society, 4 Rue de Reunes, Paris, by January 1, 1888. Competitors are reminded that the communication of processes to the society does not afford them the protection of a patent, which should be applied for before the competition.

Gold in California.

A Mexican Account of the Early Discoveries.

(Translated for the MINING AND SCIENTIFIC PRESS from *El Minero Mexicano*.)

In 1602 New California was explored for the first time by the Spanish Admiral, Don Sebastian Vizcaino, Viceroy of Mexico and Count of Monterey, who saw specimens of gold. November 3, 1774, King Philip V dispatched a long letter directed to the Count of Fuencalra, Viceroy of Mexico, su circumstantial and austere that it seemed his mind was only occupied with the conversion of the docile natives of California. In 1745 the Padre provincial Cristobal Escobar, sent to his majesty an ample report relative to Sonora and California.

June 9, 1746, Padre Fernando Cousag embarked in the port of San Carlos, situated near parallel 28°, with some Californians and a number of Yaquia, who among those Indians were the best seamen. He wrote a very circumstantial diary, which was published in Vol. 3 of "History of California," printed at Madrid. December 4, 1747, Ferdinand IV dispatched a letter, directed to the Viceroy of Mexico, confiding to him the propagation of Christianity in the Californias. October 30, 1769, Padre Junipero Serra, president of the Missions of California, sighted "la Punta de los Reyes" in latitude 37° 34' north and the Farallones of San Francisco in 37° 35'. November 7, 1769, Padre Serra and Don Gaspar Portola, Governor of the Province, reached the harbor of San Francisco, latitude 37° 46'. On the 11th of the same month and year they returned to San Carlos. In 1770 Padre Junipero having the necessary aid, went without loss of time to the port and Mission of San Diego. While there, the vehement desire of the venerable Padre for conversion increased his anxiety to found two Missions, one of San Francisco and another of Santa Clara, with protection of a Presidio at the port of San Francisco. December 1, 1774, Fernando Rivera Montcada and Fr. Francisco Palou were sent by the Government to examine the harbor. In the same month and year Capt. D. Juan B. Anza returned to Mexico to inform the Viceroy of his expedition by land, having discovered the pass of the river Colorado, and

Opened a Way in Lands Unknown.

Among many nations of heathens, all of whom manifested themselves as friends. Early in 1775 Lieut.-Col. Anza left Mexico for a second expedition. July 6, 1775, the San Carlos, in command of Lieut. D. Juan B. Ayala, of the navy, arrived at San Francisco, where Don Jose Castanayares made a particular examination of the harbor. He found the channel wide enough and entered by night without trouble. The pass is less than a league in length and more than a quarter in width, the entrance without any bar, and with strong currents, entering and going out according to the flood or ebb-tide of the sea. Within, they found a land-encircled sea having two arms, one of which penetrates to the southeast about 15 leagues, the other to the north about 5 leagues. Further in they came upon a great round bay ten leagues in diameter, into which discharged itself the river of San Francisco, half a league wide, formed of five rivers. All that immensity of water discharges itself through said pass to the Pacific and into the Gulf of the Farallones.

September 22, 1775, Fr. Francisco Palou and Miguel de la Campa Cos reached San Francisco and found letters from Fr. Vicente Santa Maria, which gave notice that San Francisco had been satisfactorily examined by the packet-boat San Carlos. At the end of March, 1776, Don Juan B. Anza, accompanied by Fr. Pedro Font, missionary preacher of Queretaro, made a new inspection of the port and selected sites for the Presidio and the two Missions. June 27, 1776, Lieut. Don Jose Moraga went to San Francisco by land with the missionaries Palou and Fr. Pedro Camhoy, taking laborers to found the Presidio. August 18, 1776, those missionaries arrived at San Francisco, on the packet-boat San Carlos in charge of Lieut. Francisco Rivera, and in September, 1776, the Presidio of the port was completed. Its foundation dates from that period.

October 9th, of same year, the Mission of San Francisco was established on a site selected near the Presidio, and Jan. 6, 1777, the Mission of Santa Clara was founded. By these means the civilization of the aborigines was begun in this distant land. In the synoptic statistical picture of the rich mineral exhibited by Heron de Villeforse, with reference to the years anterior to 1807, we may see figuring the gold of the Californias. For 45 years

The Spanish Government Maintained Dominion

Of New California, and by its impotence failed to make any profit of the wealth of the territory, notwithstanding its eagerness for the conquest of that region, as much separated from the City of Mexico as from Madrid.

In 1845 Senor Castillo, of New California, visited the cabinet of mineralogy of the School of Mines of Mexico, carrying with him specimens of native gold, of mineralized silver, of native lead, of cinnabar, and of mineral carbon; but not even these evidences of the riches of California induced the Government to pro-

tect their exploitation. A Mexican newspaper assigned the discovery of gold in California to the year 1846, attributing it to a foreign hunter who came from Russian America, incited himself with the Indians of the tribe Salsona, and remaining among them, succeeded in becoming chief of the tribe, whereby he ascertained the existence of

Their Placers of Gold;

So that when the North Americans in warlike manner invaded Mexico, they already had as incentive the gold of California, and this was the motive to attempt its annexation. In 1847 they seized by force of arms this rich country of our Republic, and on January 19, 1848, accidentally made the first discovery of the riches in gold which the waters of the Sacramento were concealing.

Captain Sutter, commander of the fort which bears his name, established on said river a sawmill, by contract with one Marshall. He built a dam, dug a channel for the movement of the water-wheel, set up the machinery and commenced sawing. One day, Marshall noticed, at the bottom of the sluice, sand mixed with gold, which was perceptible to the simple sight. This he communicated to Sutter, and they not being reserved, the news was divulged as if by enchantment. The marvelous results obtained at the beginning attracted in a few weeks hundreds of men, and before three months, to those arid places more than 40,000 men rushed, in search of the coveted metal.

[It may be well to supplement the above account by certain documentary evidence which has probably been overlooked by the writer in *El Minero Mexicano*, and which verifies his statements. It consists of extracts from documents published in Mexico in 1845, by Manuel Castanayares, Representative in Congress from the Department of Upper and Lower California, relating to the existence of gold in that Department. They show that gold had been found here in 1843. The translations were made in 1867 by Chas. G. Yale, now one of the editors of the PRESS, and were first published in a book by his father, Gregory Yale, on "Mining Claims and Water Rights in California." The extracts referred to are as follows.—EDS. PRESS.]

"The gold placers discovered in the course of last year have attracted the greatest attention, for they extend nearly 30 leagues. The good quality of this metal is made manifest by the certificate of its assay, which was made at the mint of this capital, and by the sample which I send to your Excellency. In order to develop the great elements of wealth in which California abounds, measures ought to be taken only after mature deliberation. I, therefore, shall have the honor, within a few days, of presenting to your Excellency a memorandum detailing these elements and the means of developing them with very little sacrifice. Mexico, March 2, 1844."

"The mining interest in California is of great importance, and I have the satisfaction of assuring you that it forms one of the most valuable resources of that department. Besides the silver mines which are found there, and various other mines which have actually yielded metals, the gold placer, especially, is worthy of great attention, which, extending nearly 30 leagues, was discovered lately, together with mines of mineral coal. It is painful for me to have to confess that mining is in a worse state than agriculture; the latter is in its infancy; the former it can be said is not yet born, notwithstanding that, according to the nearest estimate of reliable persons in Los Angeles, on my departure from that town in December, 1843, there were in circulation about 2000 ounces of gold which had been extracted from the above-mentioned placer, the greater part of it destined to go to the United States. This metal contains, according to the certificate of its assay by the mint of this capital which I sent to the Government at the beginning of this year, twenty-two carats, two and a half grains of gold, and fifteen grains of silver. September 1, 1844."

(To be Continued.)

THE *Kern County Californian*, speaking of the quarries belonging to the Tehachapi Stone Co., says: The brown and yellow sandstone is pronounced equal to the fine brownstone so much in use in the large cities of the East, and the company has a green sandstone that is the same class of greenstone that is all the style for artistic buildings now in Chicago and New York City. The quarries are easy of access, being only about two miles from Tehachapi Summit, on the line of the Southern Pacific railroad. The stone can be shipped readily to market and will supply building stone fully as cheap as it costs in eastern cities.

BENEFIT OF COMPULSORY VACCINATION.—The operation of compulsory vaccination was suspended at Zurich, Switzerland, in obedience to popular clamor, in 1883. The deaths from smallpox per 1000 total deaths for the two previous years and that year had been, in 1881, 7; in 1882, 0; in 1883, 8. They rose, after compulsion had ceased to be used, in 1884, to 11.15; in 1885, to 52; and in the first eight months of 1886, to 85 per 1000.

TUNNELING UNDER THE DANISH SOUND.—The proposed tunnel to connect Denmark with Sweden, it is said, is being actively promoted by French capitalists.

A Region of Subterranean Fires.

The Burning Levels of the Old Bunanza Mines.

Under the guidance of Superintendent Patton, a Virginia *Enterprise* reporter visited the underground regions of the Consolidated California and Virginia mine. The object of the visit was to inspect the apparatus by means of which it is expected to fill the old burning sections with carbonic acid gas, and thus extinguish the fire that for so many years has been smoldering there. An account of the underground trip is as follows:

We descended the C. and C. shaft at 1 o'clock in the afternoon, and remained underground until 3 o'clock. While below we visited the main shaft of the Ophir mine, the old Consolidated Virginia shaft, and all points in any way connected with the region of smoldering fires and the resulting gas.

From the 1500 station of the C. and C. shaft we took our way through the connecting drifts directly to the Ophir shaft. We found the air everywhere pure and fresh, with a draft in some of the drifts that almost amounted to a gale. The air in these places was decidedly cold, and we found the blanket coats we wore very comfortable. We mention this for the reason that there has been much talk of gas underground interfering with the operations of the miners engaged in the ore-producing sections. We everywhere met miners pushing cars of ore and rock along the drifts, and all were working in perfect comfort. The gas is all behind the bulkheads that inclose that portion of the mine in which the fire smolders among the old timbers. A man may stand with his hand upon one of the bulkheads and not be able to detect the slightest scent of gas.

The Furnace

For the manufacture of carbonic acid gas is situated on the 1700 level of the Ophir mine. It is in the station at that level, and is on the east side of the main shaft, from which it is but 30 or 40 feet distant. The shell of the furnace is of boiler iron; in fact, it was originally a large tank (in the shape of an ordinary steam boiler), which was used as a reservoir for compressed air. One end of this tank was cut out to make a door for charging it with coke and charcoal. The tank or furnace, as we may now call it, occupies a horizontal position. Firebricks have been placed in it on which to burn the fuel, and it is lined with brick in order to protect the iron shell against the great heat.

At the end of the furnace, opposite that at which the coke is introduced, is a heavy wrought-iron pipe, 12 inches in diameter. It is through this pipe that the carbonic acid gas, formed in the furnace through the combustion of coke, passes and is carried through a bulkhead into the inclosed space wherein is the fire that is to be extinguished.

The draft through the furnace is very strong, and when the fire-doors are open the flames within roar like a blast furnace. The whole interior glows with an intense white heat. Cast iron or any other ordinary metal would be melted in a moment by the great heat. Indeed, the lining, which is of common brick, is fast melting out of the shell, and it will be necessary to reline it with fire-brick.

In the furnace is burned a mixture of coke and charcoal. It consumes about one ton (of 2000 pounds) a day, producing 40,000 cubic feet of carbonic acid gas, which gas goes directly into the big pipe that leads from the furnace to and through the bulkhead.

The Course of the Gas.

We shall now follow the gas produced in the furnace till it has been carried into the burning section. Where the pipe (12 inches in diameter) leaves the furnace for the first two or three feet of its length, it is almost at a white heat. It is then carried downward and enters a large trough or flume that is full of cold water. This water is brought from the main shaft near by, and a constant stream of 8 or 10 inches passes through the box or flume. This water cools the gas that is flowing through the pipe. The pipe for a distance of 80 feet lies in this trough or flume, and is wholly covered with flowing water. Then the pipe enters the main incline, still lying in its trough, and goes down 70 feet in this way to the 1750 level. The water dashes down through this trough, and over and around the pipe, with the noise of a small Niagara.

At the Bulkhead.

Here (on the 1750 level) the large pipe enters one of the bulkheads that serves to wall-in the regions of fire. The pipe is found to be quite cool, but little warmer than the surrounding air. The bulkhead through which the pipe passes is 24 feet in thickness. All about the pipe is closely walled up, and on the outside it (the pipe) has a puddling of clay, which is constantly kept wet. We sat at this point, listening to explanations given by Mr. Patton, and not a smell of gas of any kind was observable.

A Tremendous Draft.

A tremendous draft inside of the bulkhead sucks in the carbonic acid gas brought there through the pipe. When the bulkhead was cut through for the purpose of inserting the end of the pipe, all were astonished at the draft that was disclosed. It was so great that the workmen were obliged to be on their guard against

being sucked in and carried into the region of interior fire. This may appear to be an exaggeration, but an anemometer placed in the current of air showed it to have a velocity of 500 miles an hour. On the surface of the earth 50 miles an hour is thought to be a fearful gale, but here is a gale of 500 miles. This brings into one's mind at once thoughts of the tremendous gaseous disturbances to which the surface of the sun is subject.

Of course this draft was not long left open, the influx of atmospheric air, combining with the carbonic oxide gas within, being liable to form an explosive compound. The pipe was in readiness, with its lower end closed, and it was at once thrust through the opening and the work of filling in around it begun. As the carbonic acid gas fills up the mine this great draft will doubtless slacken. It may even cease when the inclosed space is filled to a level with the end of the pipe. In case it shall do so, a blower will be placed in the pipe between the furnace and the bulkhead and the carbonic acid gas will be forced in.

The Amount of Gas that will be Required is roughly estimated at 1,500,000 or 2,000,000 cubic feet. As the gas passes in behind the bulkhead, it settles down into the lowest part of the inclosed space, being heavier than the carbonic oxide gas within, and also heavier than atmospheric air. It will go down to the 1900 level. There it will be stopped off and prevented from sinking farther by water. Thus all the inclosed space in which are the smoldering timbers will be filled up with carbonic acid gas, which will displace the carbonic oxide gas just as water poured into a bottle displaces the air.

When all the burning section has been thus filled up, the fact will be known by carbonic acid gas flowing out through the pipe on the 1500 level, through which the gas from the fire is now escaping into the old Consolidated Virginia shaft.

A tolerably close estimate of the amount of coke it will take and the time required to fill the burning section with the carbonic acid gas can be made. One pound of coke produces 20 cubic feet of gas; 2000 pounds of coke a day is consumed in the furnace, sending into the space to be filled 40,000 cubic feet of gas. Thus 50 tons of coke will make 2,000,000 cubic feet of carbonic acid gas, which will fill the burning section, and the time occupied with one furnace (burning one ton of coke a day) will be 50 days. But a second furnace may be put in and the operation shortened to 25 days.

A Second Pipe Now In.

A second pipe, a small one, its diameter being but four inches, was yesterday about in place, which will take gas from the furnace now in use to supply the 12-inch pipe. This pipe runs up to the 1600 level, where it passes through a bulkhead 24 feet thick, faced with two feet of solid masonry. This will pour in the choking carbonic acid gas the same as the large pipe is doing. The operation will, no doubt, prove a complete success, unless there may be in places caves that have closed up and isolated some chambers in which there is smoldering fire. This would prevent the gas now being injected reaching such places. This, however, is a thing to be ascertained after the fire has been extinguished in the sections now attacked. If such isolated chambers shall be found, they will be drowned out with the gas, the same as at present being done in the section of the mine that is being operated upon.

There are some places over the inclosed section (in its roof) from which the carbonic oxide gas now escapes through fissures in the rock, but this will not at all interfere with what is now being done, for it makes no difference whether this gas from the smoldering fire goes out through these fissures as the carbonic acid gas rises, or goes out by way of the Consolidated Virginia shaft.

The Artificial Outlet.

The main outlet for the gas from the burning section is through an 11-inch pipe on the 1500 level, near the Consolidated Virginia shaft. This pipe passes through a bulkhead and thence goes into the bottom of the north compartment of the shaft. There is a great draft through this pipe, the shaft being a strong up-cast. Though the end of the pipe is open to sight where it passes under the bottom of the shaft compartment, one may stand within five feet of it and smell no gas. At the same time the gas is so strong and deadly that a lighted candle held in it is extinguished as quickly as though it had been thrust into a bucket of water. There is no danger in thus thrusting a flame into carbonic oxide gas of this strength, but were there mingled with it a certain considerable per cent of atmospheric air, it would become fire-damp and would explode with terrific force. Indeed, at the time the bulkheads were being put in, several very violent explosions occurred on account of the admission of too much atmospheric air.

Men were at work all about this escape pipe and, indeed, were constantly passing to and fro through drifts where the carbonic acid gas was coming up through fissures in the rock, without the slightest fear or inconvenience. Where the gas comes up at the fissures it is overcome by a superabundance of atmospheric air; it is weakened beyond the exploding point, for there is a draft of pure air rushing through that amounts to a gale—an underground hurricane. Yet,

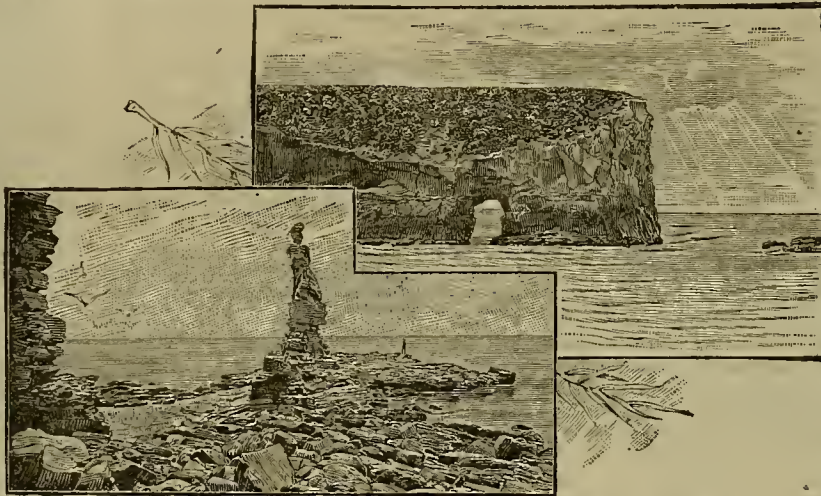
hold a candle to one of the rock fissures and the light, burning wick and all, is extinguished instantly. Here is the only place in the mine where one gets a smell of the gas, and it is by no means as strong as it is at times found (when the atmosphere is in the right condition) on the surface, near the old Consolidated Virginia shaft.

In Conclusion,

It may be stated that after the inclosed section shall have been filled to overflowing with the carbonic acid gas, it will be allowed to remain a month or two before any of the bulkheads are opened. The opening will be very cautiously done, and only after carbonic acid gas has taken the place of the carbonic oxide gas at the escape pipe. This may be known by several tests. A very simple one is to introduce the gas into lime-water, when a precipitate will at once be formed of the contained lime.

The rock in the mine will retain heat a long time, but this may be overcome by the use of water thrown on through a hose, once the fire is out and the gas gone.

The glowing furnace at the 1700 level of the Ophir, where the gas is made, presents a novel and striking scene—a scene almost startling to an old Comstocker coming suddenly upon it from a dimly lighted drift. It sends a red glare all about the station, such as one sees in a big foundry where small rivers of molten iron are flowing about. The men, too, look in the red glare like beings belonging a little lower down in the subterranean regions where old Satan is firing up. It was yesterday compared with the furnaces in the hold of a big ocean steamer, but here the fire is much fiercer. The coke and charcoal, under the strong—fearfully strong—draft, bring all inside the furnace to a white heat. The heat and glare are so intense that one feels all the time as though there were danger of something giving way or blowing up.



WAVE SCULPTURE AT SANTA CRUZ AND SANTA MONICA.

Then besides the roar of the furnace, there is the roar of the falling water in the incline, the rattle of cages and the clank of machinery. All these sights and sounds taken together constitute a small pandemonium, which it is worth while to experience, as it jolts one out of the every-day, jog-trot scenes and sensations of life.

A QUARTZ MILL IN BOISE CITY.—Mr. O. Jacobs intends to build a five-stamp quartz-mill in this city and attach it to the water-power which runs his grist-mill. The stamps, battery, etc., are in a mill which he owns in Red Warrior district, near Rocky Bar, Alturas county, Idaho, and have not been in use for several years, but are well preserved and as good as new. As soon as teams get in to Rocky Bar he will send for the battery and put it up here. This will afford an opportunity for prospectors and quartz miners in the vicinity, and there are several, and will be many more working quartz mines in the hills north of town as soon as they have an opportunity to reduce the ore or work it near home. There is no doubt but a mill of this kind will pay the owner and be a benefit to the city—something that has long been needed.—*Boise Statesman*.

BUY TAILINGS.—The *Lyon County Times* says: It is our private opinion, publicly expressed, that a person with money to invest might get a great deal better buy tailings with it than stock. It will not be a great while before all the low as well as high grade tailings in this State will be worth considerable money, from the fact that a process has now been found by which they can be worked, and nearly all the bullion in them secured. But a short time will elapse before Dr. Rae's electrical process will be in use in all the mills in the State. There is yet an immense quantity of tailings scattered around in large and small lots in the State, and it appears to me that a man with capital could make many much more investments.

THE Bisbee steam wagon takes the loaded wagons from Bradshaw's station to the town, a distance of nine miles. It makes a round trip daily, and hauls five of Carr's large freight wagons easily. The wagon is fast gaining favor in the eye of the mine-owners of Bisbee.—*Tombstone Epitaph*.

California Coast Scenery.

On leaving San Francisco bay, through the famous Golden Gate, a fine view is presented of that historic portal. One can obtain, from the ocean point of view, a much better idea of the harbor entrance than from the hills on either side. The steamer passes close outside of the Seal rocks, and in its southern course soon passes Point Montara, where there is a fog signal. Four miles below is Pillar Point, behind which is Amersport Landing or Half Moon bay.

Pigeon Point, the next noticeable landmark, has a lighthouse of the first order and a fog signal. The country in the vicinity of this point is a fine potato-raising section, and there are some sawmills near there also. New Years Point (or Ano Nuevo) is 18 miles above Santa Cruz, and is another fog-signal station. Another lighthouse is met at the point at Santa Cruz. Here opens the wide expanse of Monterey bay, around the edge of which are many settlements of more or less note. At the northern extremity is Santa Cruz, and at the southern, Monterey, where so many tourists gather every year.

After crossing Monterey bay and passing Point Pinos, the small bay of Carmel is passed, a place where formerly the whalers had a rendezvous. Between that and San Simeon is Point Sur, a high, round-topped point connected to the mainland by a low neck. Then comes Piedras Blancas (white rocks), where there is a lighthouse marking the northwest point of San Simeon bay. Near San Simeon is a whaling station, and just below is the town of Cambria, where small vessels land for dairy

Learning to be a Mechanic.

Much apprehension exists, not only among young men but also among older and experienced ones, about the means of acquiring the mental and physical skill necessary to become a good mechanic. A cotemporary, in speaking upon this subject, says that proper attention to dictums, and a certain amount of memorizing of rules, is well enough; but the learning to become a mechanic is education, training, discipline. Mere accumulation is not education. Books for the young mechanic are of great service, but oral instructions with examples are of greater value. Books are guideboards pointing the road; living instructions are vehicles that take you on your road.

But, after all these, there is the necessity of personal endeavor. If the phrase "self-taught" ever has a meaning, it is when applied to a good mechanic. The learner must be a practitioner. All the books and all the oral instruction in the world will not produce a good filer or make the apprentice a good chipper nor teach him to properly handle a lathe. These instructions must be supplemented by a long, patient practice, by repeated trials, with accompanying failures.

From the school and the playground the apprentice enters the shop, where one of his first surprises is to ascertain that he has muscles that are unused, or, at least, are not under control. Drawing a file straight is a test of the power of will over muscle; so is the striking the head of a cold chisel with a hammer while the eye is on the chisel point; so is the sudden, instantaneous shifting of the lathe belt in screw cutting—in short, the shop is a wonder-hall where much is new and strange.

No study of books, and no verbal instruction alone, will reconcile these new things to the acquired habits of body. But these, combined with unwearying, painstaking practice, will do it. Let the neophyte settle, once for all, in his mind, that no more dependence can be properly laid upon outside aid, whether of books or men, than of pointing the way and showing the "how." Let him settle solidly to the belief that he is to make his own way in the shop, as afterward in the world, and act accordingly. The way will then gradually clear before him. But let him beware of the conceit that he is independent of books and men—they are only helps, but they are necessary helps. With a fair knowledge of arithmetic, and a habit of observation coupled with a desire to know "the reason why," the mechanics' apprentice is pretty well fitted to enter the shop.

Another writer upon the same subject gives the following important hints as to

How to Learn:

What a mechanic most needs to-day is to know how to think. A man who can do this is never at fault for ways or means; he can meet any emergency. If a difficult job comes along, he rises to it and enjoys conquering the difficulty. He is an inventor. He invents hundreds of things every month of his life.

Such a man loves dearly to go on a tramp. He loves to go into every shop and factory and use his eyes. That man is a scholar; is at school all the time; has learned the one vital lesson and knowledge is his. Our man has learned how to learn. Not a shop does he enter but something appears which he wishes to see. He learns a new kind while he is watching Boh light his pipe or set a lathe tool. He finds a treasure where Mike would see nothing but steel, scrap iron and \$2 a day.

Perhaps our man has got half an idea as to some improvement to a machine. He is working up his odd minutes in perfecting his invention. As he walks through a shop he sees a jig for some peculiar job. It is nothing but a couple of screws and two pieces of iron, yet it suggests something, and his invention is perfected. Like a flash the mind catches the idea of what is wanted, yet the article which suggested it is no more like it than "elbow grease" is like "taper oil."

When you learn a trade or study a lesson, then learn how to catch new ideas. Learn this thing, and if you can do it the trade is yours.

A FINE MARBLE QUARRY OPENED.—Recent developments in the Slover mountain marble quarries, near Colton, San Bernardino county, demonstrate the fact that that mountain is not only composed of some of the finest building material to be found on this coast, but that there are ledges of fine statuary marble that, according to statements of Italian sculptors to whom samples have been sent, is equal and even superior to the finest Italian marble. L. L. Dyer, of Troy, New York—a gentleman who has spent his entire life in fine marble work—is the superintendent of the Colton Marble Company, and is rapidly developing the quarries. Seventy-five men are now in the employ of the company, and this number will be increased to several hundred as soon as the machinery is put in working order for cutting the marble.

THE coal shipments from Seattle during the month of March amounted to 22,218 tons; from Tacoma, 22,171 tons; from Nanaimo, 18,595 tons; and from Departure bay, 11,450 tons. The shipments from Puget sound thus exceed those from British Columbia nearly 15,000 tons.

THE Atchison, Topeka & Santa Fe railroad proposes to develop the coal fields of Northern Mexico.

THE Toiyabes will be extensively prospected this summer. Big discoveries are among the possibilities, as this range is one of the best mineralized in the State and rich in the ores of nearly every known metal. There is not a better field anywhere for a prospector to operate in.—*Belmont Courier*.



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SAN FRANCISCO:

Saturday Morning, April 30, 1887.

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MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 288-9. **MINING STOCK MARKET.**—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 292.

Business Announcements.

Pumps—San Francisco Tool Company.
Metallurgist and Assayer—J. W. C.
Rubber Hose—Goodyear Rubber Co.

See Advertising Columns.

Passing Events.

Placer mining strikes are reported both in Arizona and Mexico this week, and have caused some local excitement at Phoenix and Nogales. No details have so far been furnished.

The building of water-power mills on the Comstock, soon to be commenced, is a move of great importance for that section. Everything that will tend to more economy in quartz crushing will help the Comstock mines, where they have such an abundance of low-grade ore.

Railroad building in this State is going on in many directions and new regions are being opened in many counties. It will only be a short time before we shall have direct railroad communication with Oregon. To the South, however, is where most of the work is now being done.

A good many miners seem to be going north this summer, to Alaska, Idaho and Montana. The mining season is about open in all those regions.

MECHANICS' INSTITUTE EXHIBITION.—The Board of Trustees of the Mechanics' Institute announce that the Twenty-second Industrial Exposition of the society will open on Thursday, Sept. 1, 1887, and will close on Saturday evening, Oct. 8, 1887.

On the east side of Panamint valley, Inyo county, is a very large ledge of antimony ore. The metal was quoted recently in London at \$150 per ton. No effort has ever been made to do anything with this ledge.

Prospecting in California.

The season for prospectors' work in the field having now commenced, we may expect from this on to hear of mining discoveries in many directions. While, of course, most of the region near by the more prominent mining camps has been pretty well searched over, there is still a large area of this State where the prospector has a chance to explore. And, moreover, some camps which have been comparatively little worked, but have been known for years, are showing up good properties. Hildreth, in Fresno county, is one of these now coming to the front. The Julian and Banner mines, in San Diego county, are others. The old Holcomb Valley mines, in Southern California, are once more attracting attention. Even in this central and well-known Nevada county mining towns, there is a greater era of quartz development than ever before. Then the Piru mines, in Ventura county, the Cargo Muchacho, in San Diego county, and others thereabout are attracting attention.

There is no reason at all why quite a large range of country to the south, as well as to the north, should not, in time, show up many mines. As the country becomes settled up more than it has, more careful search will be made. Men will not try to cover too wide a range in their prospecting and will confine their operations to more limited fields. This will result in more careful search, as a matter of course. And now that the conditions of quartz mining in California are so much better than they were 10 years ago, there is more encouragement for prospectors and miners. Small mines are now worked profitably, which, when loaded down by companies and officials, were failures. We are learning every day how to work our quartz properties more economically.

New Placer Discoveries.

Boring of artesian wells and searching for water is going on all over this coast. There are so many regions where water is scarce that every effort has to be made to get it. Tunnels are run into hills, springs are opened, wells are bored and dug, canyons and gullies are searched, all to find water. In doing this kind of work it is but natural, in a mining country, that minerals will sometimes be found, as has been the case in several instances. The latest one of the kind is at Phoenix, Arizona, where there is quite an excitement from the striking of rich placer gold at a depth of 41 feet in an artesian well now being sunk in the Courthouse plaza. This sand-pump brought up fine gravel and black sand, which a miner named S. L. Sanders prospected, and out of a single handful of gravel took a dozen colors of coarse, bright gold. This bedrock has not been reached, which makes the discovery more important, as the gold stratum may be several feet deep. The whole of Salt River valley is said to be underlain with such gravel and sand.

A dispatch states that there is also much excitement at Nogales, Arizona, among mining men, over the discovery by some American prospectors of immensely rich placer mines near the town of Bacnacha, in Sonora, 50 miles southeast of Nogales. It is thought that these are the rich diggings worked by the Jesuit priests 200 years ago. There is a general rush from Nogales.

California Railroads.

A great deal of the material progress of California of late years is due to the creation and extension of the railroad systems of the State. For a time a few years back there was a cessation of railroad building, but for months past gangs of men are at work all over the coast engaged in railroad construction. In California the roads are being extended, and new tracts are feeling the influence of the presence of the locomotive. Rapid settlement of the country is the result, and on all sides are seen the evidences of progress and development. Of course, in carrying out this railroad work immense sums of money are expended for labor and material, which goes into business channels. It is a source of congratulation that this work of construction is again so active, since it augurs well not only for present confidence but future prosperity. There are still several parts of the State where little has been done in railroad building, and these parts are not nearly so prosperous, nor advancing so

rapidly, as where the trains are running. The railroad men will not, however, stop with their present plans, but will doubtless look after the interests of other sections in due time.

The following statement of the railroad systems of California shows in brief the miles of road in operation up to the end of last year:

Southern Pacific Company.

PACIFIC SYSTEM AND NORTHERN DIVISION.

PACIFIC SYSTEM AND OTHER RAILROADS IN THE STATE OF CALIFORNIA.

Central Pacific Railroad—	Miles.	Miles.
San Francisco to Ogden.....	279.86	
Niles to San Jose.....	17.54	
Lathrop to Goshen.....	146.08	
Oakland local lines.....	4.84	
Alameda local lines.....	12.47	
Roseville to Delta.....	190.08	
Delta to Gibson.....	7.22	
Gibson to Hazel Creek.....	5.60	
Hazel Creek to Dunsmuir.....	10.90	
Dunsmuir to McClellan.....	13.10	
	687.60	

California Pacific Railroad—	
Vallejo Junction to Vallejo.....	2.00
Vallejo to Sacramento.....	60.39
Davis to Knight's Landing.....	18.87
Napa Junction to Calistoga.....	34.45
	115.44

Northern Railway—	
West Oakland to Delaware Street.....	4.63
West Oakland to New Martinez.....	31.03
Port Costa to Suisun.....	17.33
Woodland to Tehama.....	100.74
	153.63

San Pablo and Tulare Railroad—	
New Martinez to Tracy.....	49.51
	49.51

Stockton and Copperopolis Railroad—	
Stockton to Milton.....	30.00
Peters to Oakdale.....	19.00
	49.00

Amador Branch Railroad—	
Galt to Ione.....	27.20
	27.20

Berkeley Branch Railroad—	
Shell Mound to Berryman.....	3.84
	3.84

San Joaquin Valley and Yosemite Railroad—	
Berenda to Raymond.....	21.00
	21.00

Los Angeles and San Diego Railroad—	
Florence to Santa Ana.....	27.60
	27.60

Los Angeles and Independence Railroad—	
Los Angeles to Santa Monica.....	16.83
	16.83

Southern Pacific Railroad of California—	
Huron to Colorado River at Yuma.....	629.12
Los Angeles to San Pedro.....	24.24
	553.36

Total Pacific system, not including Northern Division (in California).....	1702.10
NORTHERN DIVISION.	

Southern Pacific Railroad—	
San Francisco to Tres Pinos.....	100.49
Cornadero to Soledad.....	60.40
Soledad to Kings.....	20.30
Kings to San Ardo.....	19.20
San Ardo to San Miguel.....	24.40
San Miguel to Paso Robles.....	9.30
Paso Robles to Templeton.....	5.60
	239.50

San Jose and Almaden Railroad—	
Hillsdale to Almaden.....	7.80
	7.80

Monterey Railroad—	
Castroville Junction to Monterey.....	15.12
	15.12

Pajaro and Santa Cruz Railroad—	
Pajaro to Santa Cruz.....	21.20
Aptos to Monte Vista.....	5.00
	26.20

Total Northern Division.....	283.71
Total Pacific system in California, including Northern Division.....	1990.81

Central Pacific Railroad (bet. S. F. and Ogden) In the State of Nevada.....	443.73
In the Territory of Utah.....	154.64
	603.37

Southern Pacific Railroad of Arizona—	
Yuma to Territorial line of New Mexico, in the Territory of Arizona.....	383.74
	383.74

Southern Pacific Railroad of New Mexico—	
Territorial line of New Mexico to El Paso, in the Territory of New Mexico.....	171.06
	171.06

Total Pacific system without the State of California.....	1158.17
Total Pacific system.....	3148.98

California Southern Railroad—	
National City to Earlston.....	210.42
Los Angeles and San Gabriel Valley Railroad—	
Los Angeles to Lamanda Park.....	11.80
	11.80

Northern California Railroad—	
Marysville to Oroville.....	26.60
San Francisco and North Pacific Railroad—	
Donahue to Cloverdale.....	58.00
Junction to San Rafael.....	20.50
San Rafael to Tiburon.....	9.00
Fulton to Guerneville.....	16.00
	101.60

Sacramento and Placerville Railroad—	
Sacramento to Shingle Springs.....	47.71
Vaca Valley and Clear Lake Railroad—	
Elmira to Madison.....	29.00
Visalia Railroad—	
Visalia to Goshen.....	7.33
	434.26

NARROW GAUGE RAILROADS.	
Carson and Colorado Railroad—	
State Line to Keeler, Inyo County.....	108.00
Nevada County Narrow Gauge Railroad—	
Colfax to Nevada City.....	22.64
North Pacific Coast Railroad—	
Sausalito to Ingrams.....	86.25
Pacific Coast Railroad—	
Port Harford to Los Alamos.....	63.86
Sonoma Valley Railroad—	
Sonoma Landing to Glen Ellen.....	21.43
South Pacific Coast Railroad—	
Oakland Point to Santa Cruz.....	84.60
San Joaquin and Sierra Nevada Railroad—	
Brooks to Valley Spring.....	39.60
	426.38

Total narrow gauge railroads in California.....	426.38
Total miles broad gauge railroad in California.....	2425.07

COL. GEO. E. WARING, the widely-known sanitary engineer, is on a visit to this city. He is on the coast for the purpose of designing a sewerage system for the city of San Diego.	
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Reclaiming Land in California.

The Engines and Pumping Machinery Employed.

Up to a recent date the reclamation of swamp lands in California has been more or less of a failure; most of the early efforts in this direction were undertaken with a very slight knowledge of what was required, and the machinery used was inadequate. In fact the appliances were crude and the systems not of a character to insure success. The greatest difficulty met with was one that was not sufficiently recognized at first, and that was the seepage of water that comes through the best levees that can be constructed with the material at hand in the locations where the levees have to be built.

As a consequence, at various times, when crops inside these levees promised large yields, they were entirely destroyed by seepage water caused by high water outside the levee during the spring freshets. There is little difficulty in making the levees high and strong enough to withstand any pressure which is likely to ensue from freshets. This being accomplished, the only thing remaining to perfect a reclamation scheme is to take care of what water may seep through the levee and the rain-water that falls within the reclaimed area in the winter season. At that time, of course, the evaporation is hardly noticeable, and this water must be taken care of by other means.

Before attempting to explain the methods which have been adopted to take care of the seepage-water in various districts, it might be well to enumerate a few of the advantages which reclaimed lands have over the irrigated lands of the State. 1st. The lands are superior in quality. 2d. The land will, in many cases, yield from two to three crops a year. 3d. It is in all cases, at present, arranged so that it can be irrigated if necessary, as the land lies below the surface of the outside water; therefore, by means of iron pipes with gates, it can be irrigated at will. On the other hand, when lifting the surplus water from the land, it can be kept at the most suitable distances from the surface of the land, thus insuring a full crop every year. As to the cost of reclaiming land, it of course depends on the conditions, of amount of area, length of levee, etc. The cost is from \$20 to \$50 per acre, according to size of district and character of levee.

The cost of this land before reclaiming, in most instances, is \$4 per acre or thereabouts, and after being reclaimed, sells readily at from \$100 to \$1000 per acre. In instances where the land has been properly reclaimed and set out in orchards, prices as high as \$1000 per acre have been offered.

The lands which have been reclaimed are mainly in Sacramento, San Joaquin and Colusa counties and near Stockton. It has been found from experience that it is not practicable to reclaim lands west of Collinsville, as is shown by the failure in reclaiming Sherman island, the failure being caused by the hardship being so far from the surface that it was found to be utterly impossible to build a levee that would not sink. The condition of the islands further to the eastward, along the banks of the Sacramento and San Joaquin rivers, is different entirely from the Sherman, as we shall show further on in this article.

More recently, the conditions of the whole matter have been very much better understood, so that the difficulties which were met with in the earlier history of reclamation in this State have been obviated.

In 1881, the San Francisco Tool Company began to turn its attention to perfecting reclamation machinery and has since then paid special attention to the subject, and erected many successful plants. As a history of this company's work in this direction is, in a measure, a history of recent land reclamation in California, it will be well to follow it.

The first plant they erected (in 1881) was on Rough-and-Ready island, on the San Joaquin river. There they placed a 10-inch centrifugal pump. At the time this pump was put in there had been a break in the levee, and the island had been completely inundated. The island was pumped out at a cost of \$1.50 per acre, and the whole finally reclaimed, making the land worth, after reclamation, from \$150 to \$400 per acre, while, without the pump, it could not have been successfully cultivated. It may be added here that this pumping was done with a 20-horse power thrashing engine, which, during the sum-

mer, was utilized for harvesting purposes. It was found by experience that it was too expensive to continue pumping with the thrashing engine, and eventually a 15-inch pump was put in, with suitable horizontal boiler and a single-acting engine of the San Francisco Tool Company. Some of this land has recently been sold for \$400 per acre.

The Pearson Reclamation District, near Courtland, Sacramento county, is a notable instance of the value and success of the appliances adopted. In the first place, the Tool Company put in a 10-inch pump, which was afterward replaced by a 12-inch one. Then a 15-inch pump was added. In their contract with the San Francisco Savings Union, they guaranteed the 15-inch Gwynne pump, together with the 12-inch turbine, to raise at least 10,000 gallons of water with an indicated 40-horse power against a head of 10 feet. The results of accurate measurements, made by a thoroughly competent engineer, showed that with only 88 revolutions of the engine, or 264 revolutions of the 15-inch pump, and 234 revolutions of the 12-inch pump, they were able to raise 16,000 gallons per minute, with an indicated horse-power of about 50 against a head ranging from 9 to 14 feet. The average daily consumption of coal was 3750 pounds of South Prairie screenings for a run of 24 hours. After awhile the 12-inch pump was replaced by another 15-inch one, and there then was added a 30-inch siphon centrifugal pump. Then later on there was added to this another 30-inch pump, making two 30-inch pumps and two 15-inch pumps, having a capacity of 100,000 gallons per minute, which is equal to a stream 33 feet wide, 7 feet deep, and running 50 feet per minute.

This siphon centrifugal pump is now adopted in all large reclamation districts in Europe to the almost entire exclusion of other systems. Its main features are: The siphon action preventing the pump from at any time raising the water higher than the exact difference between the two water levels; the connecting of the runner of the pump in a direct manner to the main shaft of the engine on a level above any possible flood-water; the discharge pipe conducted over the levee down to a point below the lowest possible low-water mark of the outside stream. No foot or discharge valves of any kind are used, thus avoiding all friction inevitably caused by valves. The pump is charged by means of the vacuum created by the condenser. When the pump is stopped, a water-gate placed at the discharge of the pump, prevents the outside water from siphoning over the levee into the district; the pump in the meanwhile remains charged or primed. Large hand-plates in the aide facilitate the examination and cleaning of the runner. The pump is connected directly to a compound condensing engine with variable expansion gear. The diameter of the high and low pressure cylinders, 14 inches and 26 inches respectively. The stroke is 18 inches; the number of revolutions is from 130 to 210 per minute, according to the height the water is to be raised or the quantity desired to be discharged under any given circumstances—which can be increased from a minimum of say 10,000 gallons per minute to a maximum of 60,000 gallons per minute. The diameter of the discharge pipe was increased from 30 inches to 40 inches immediately after leaving the pump, and that of the suction pipes from 23 inches to 28 inches, insuring a minimum of friction (3½ feet per second, discharging 38,000 gallons per minute), which will greatly save in running expenses the slight excess of first cost incurred. The average of several tests, conducted personally by the agent of the Reclamation Company, showed its capacity to be 37,907 gallons per minute at a lift of 11 feet 7 inches, the engine indicating 156-horse power, with a consumption of 4.4 pounds average Sydney coal per actual horse-power of water raised per hour, the most satisfactory and economical showing so far made by any pumping plant.

This district was at first in the hands of Mr. Pearson, after whom it was named, but finally came into the hands of Mr. P. J. Van Lohensels, at a time when it was really worth about \$3 per acre, there being about 9000 acres in the tract, surrounded by a dike or levee 1½ miles long. The pumping appliances made by the Tool Company were erected under the supervision of Mr. P. J. Van Lohensels, to whom the success of the Pearson reclamation district is largely due.

He was very energetic and untiring in his efforts to carry out the plans, and was confident of ultimate success.

The whole island is now under cultivation, and the land is worth all the way from \$100 to \$150 per acre, and in some places more, where improvements have been made. This pumping machinery is only run during the winter months, and in ordinary years, the two 15-inch pumps will take care of this district, the large 30-inch pumps only being used as a precaution against rains and freshets. This is the largest reclamation plant in the United States.

"Andrus Island."

At Andrus island (Reclamation District No. 407) a ten-inch turbine was at first put in. When it was put in operation in May, 1884, there were from 800 to 1000 acres of tule land under water, varying in depth from a few inches to



SECTION ACROSS BLACK RANGE AND VERDE VALLEY.

four feet. This water was all pumped out in two months, and in October a crop of buckwheat and beans was being harvested from land which was three feet under water in May. Since then they have made a change and replaced this pumping plant with two 16-inch submerged pumps and one compound condensing engine, with suitable condensing apparatus and boiler capacity to raise 33,000 gallons of water per minute. This has all been done under the supervision of J. C. Pierson, C. E. of Sacramento, and chief engineer of Reclamation District No. 407.

The fourth plant is on the land of Geo. F. Smith, at the edge of the river near Stockton. It is a submerged centrifugal pump, plain slide

It will be seen from what we have said that the engineering problems connected with the reclamation projects in California were by no means simple. The San Francisco Tool Company having had great experience in the construction of the drainage machinery, now know exactly what is required in special cases. Of course we have only mentioned a few of the plants constructed by this company. At the Pearson district and Tyler island, especial pains were taken to put up suitable buildings for pumping stations.

The Black Range Copper District.

The copper mines of the Black Range are situated in Yavapai county, Arizona, some 60 miles south of the Atlantic & Pacific railway, and 20 miles east of Prescott. They remained un-

the sandstone, capped with lava of variable thickness. In the distance are seen the snow-covered peaks of Mount Agassiz, some 13,000 feet in height. Mount Agassiz is an extinct volcano and the source of an enormous lava-flow, covering the ground from the Verde valley to the mountain, some 40 miles distant.

In 1883, the mines of the Black Range were first opened on a considerable scale. Roads to the Atlantic & Pacific Railway and Prescott were built; houses and smelting plant were erected. Smelting was begun with a 42-inch furnace in August of that year. True yellow sulphurets are found in these mines, with some silver and a little gold.

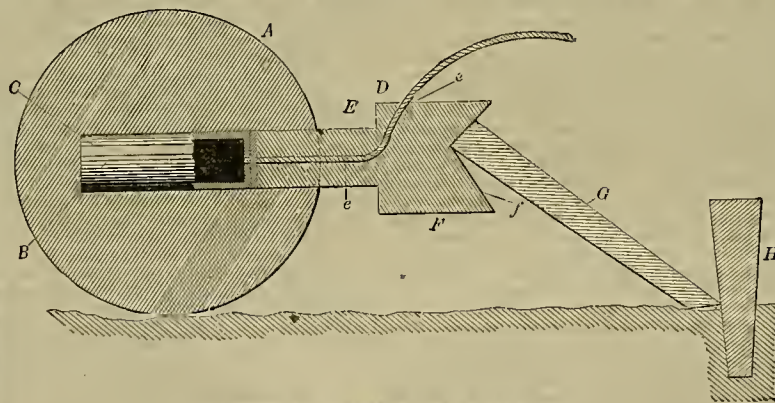
Blasting Plug for Timber.

Powder for splitting logs is largely used on this coast, where our trees are of great size. Wm. T. McCall, of St. Clair, Alabama, has patented an improved means of splitting logs, which is especially applicable to long, thick logs. We give an engraving on this page which shows his plan. A designates the section of a tree-trunk of about 22 feet long and 2½ feet in diameter. B is a canal, preferably of circular section, made on a radial line of the log at about the central point of its length. The canal, B, penetrates to a proper distance on the opposite side of the axis of the log.

C is a cartridge filled with gunpowder or other proper explosive, and made to fit snugly in the canal, B. The cartridge is of suitable length to lie, when inserted to the bottom of the canal, with its center in the axial line of the log. c is a central opening through the outer end of the cartridge-casing. D is a block of metal, preferably cast iron, having the extension, E, and the head, F, as shown. The extension, E, is of proper shape to be inserted snugly in the canal, B, upon the cartridge, C, and is sufficiently long to be used with logs of different diameters.

E is a central longitudinal canal through the extension with its outer end bending upward or outward in the head, F, and ending in an orifice, c. The inner orifice of the canal lies upon the opening, c, of the cartridge. The head, F, of the block, D, is provided on its outer end with the re-entering shoulder, f. G is a metal bar, preferably of cast iron, which, in practice, has its upper end formed to fit within the shoulder, f, and has its lower end braided against the metal block or bar, H, which is driven into the ground.

In practice the block, D, weighs about 12 pounds and the bar, G, about 40 pounds. The bar, G, is about four feet long, and the block or bar, H, about two feet long, with one-half its length driven into the ground. The log lies with the canal, B, on one side, and the canal, c, is properly primed up to the orifice, c, so as to fire the cartridge therefrom; or a fuse, I, may be inserted into said orifice and fired in the usual manner. It is found in practice that by these means the log can be split straight or into longitudinal sections. A light wad, i, is placed between the ends of the extension, E, and the cartridge when gunpowder or any material that does not explode by concussion is used; but if a material that is liable to explode by concussion is used, a spiral spring is placed between the extension and the cartridge to prevent such explosion. The inventor thinks that better results are obtained by the use of gunpowder and similar slowly exploding materials than by quickly exploding materials, which would be apt to break the log into small fragments.



SPLITTING TIMBER BY BLASTING.

valve engine, with a suitable boiler, with a capacity of 11,000 gallons per minute. The plant is highly successful, and keeps the land free from water.

The fifth is on what is known as Dr. Toland's ranch, near Rio Vista, where a submerged pump with a 50-horse power, single-acting engine and boiler, was put in under the supervision of E. C. Dozier, the capacity of this plant being 15,000 gallons per minute.

The sixth is on Tyler island, near Walnut Grove, for John Miller. That is a submerged pump, a compound condensing engine with the necessary condensing apparatus, with a capacity of 36,000 gallons per minute.

Those desirous of resorting to the use of pumps for the reclamation of land are referred to the Pearson Reclamation District, Tyler island, and District 407, Andrus island, as being three of the best reclamation pumping plants ever erected so far in this country. Mr. J. C. Pierson, C. E., who has devoted most of his time for the last five years to the construction of levees, etc., was the engineer in charge of putting the pumping machinery on Andrus and Tyler islands,

is crossed, which has some local importance by reason of the gold veins it contains. The Chino valley, covered with a heavy deposit of wash, is next reached, and no rock in place is seen until the west flank of the Black Range is approached. Here another belt of slate, striking northerly and southerly, is crossed; and then the limestone of the Black Range proper is reached.

This is a table-mountain, composed exclusively of limestone, the age of which has been determined as carboniferous, by the finding of the characteristic shell *productus*, so determined by Prof. J. S. Newberry. The limestone range is intersected by many dykes of an eruptive greenstone rock, generally from 40 to 200 feet in width. These dykes are found on the very crest of the mountain. Descending the eastern slope of the mountain, a belt of diorite is reached, and in this are the principal mines of the district.

The Hampton and Eureka mines overlook the Verde valley, which is a valley of erosion in Triassic red sandstone. The western slope of the Verde valley, seen from the Eureka and Hampton mines, presents bold escarpments of

SOUTHERN CALIFORNIA MINING NOTES.—S. P. Blade sends us the following notes from Daggett, San Bernardino county: There is a prospect that Los Angeles parties will build a 10-stamp mill next month at Soda Lake mining district, north of Lndlow, on the railroad line. Another one of similar capacity is projected at the Needles, on the Colorado river, by other men from the same city. The grading for the mill is now being done. A good body of galena has recently been found 55 miles below the Needles by Mr. Thomson. The vein is large and the ore of high grade. Silver has been going down, but the "gold bugs" will take a back seat in 1888 and bi-metalists come to the front. The prospects of the Daggett mines, even in gold, are good, as shown by the tests made.

MECHANICAL PROGRESS.

A New Locomotive.

The Specialties in its Construction and How They Worked on Trial.

At the meeting of the Franklin Institute, held at Philadelphia, Pa., March 16th, George S. Strong, of New York, described the "Strong" locomotive. On the 17th an experimental trip was made on a locomotive of this design, built by the Lehigh Valley Railroad Company, on which road it is in active use. The locomotive was used to draw a train from White Haven, above Mauch Chunk, to Wilkes Barre, and return over the Nesquehock mountains, a spur of the Blue Ridge.

The locomotive is peculiar in several respects. The boiler of the engine consists of two parallel cylinders bolted together and united by a hemispherical shell to a single cylinder which forms the interior portion. The total length of the boiler is over 30 feet. The shell is made of steel plates welded in the longitudinal seams and riveted by a double row of rivets in the circular seams. The fire-box consists of two corrugated steel cylinders, made on the same general plan as the boiler and united by the single combustion chamber, which occupies the hemispherical portion of the boiler, to the tubes. The object of the corrugations is to increase the heating surface and to allow of expansion and contraction. The two fire-boxes traverse the parallel sections of the boiler and are suspended at the middle by a sling, no stays or other supports being introduced. The grate-bars are hollow and connect with a chamber in the bridge of the combustion chamber, through which a current of heated air passes to finish the combustion of the gases generated by coal. The lining of one of these furnaces does not dampen the boilers, for the reason that the gases from the other are being consumed during that process. The valve-gear of the locomotive is peculiar in that it is double, one set of valves controlling the exhaust, the other the steam supply, but both of these are worked from a single eccentric attached to the axle of the driving wheels. The object of this arrangement is to allow a more complete expansion of the steam, and consequent increase of efficiency, without checking the exhaust and causing compression. The valve motion is controlled by a series of levers, and the valves, of the ordinary "gridiron" type, move vertically.

The engine (No. 444) of the Lehigh Valley service has six coupled driving wheels, 62 inches in diameter, on which there is a total weight of 90,000 pounds. Two trucks, one supporting the forward, the other the rear of the engine, bear respectively 27,000 and 20,000 pounds. The total grate area is 62 square feet; heating surface 1848 square feet. Her cylinders measure 20x24 inches, and she carries 160 pounds boiler pressure readily. The general appearance of the engine is very handsome. The cab is situated on the top of the boiler and about in the middle of its length.

The stretch of road over which the trip was made is a very difficult one, no portion of it being at a less gradient than 64 feet to the mile. At some portions the gradient amounts to 96 feet to the mile. The road has very numerous sharp curves, but is well laid and ballasted. From White Haven it is a steady climb of 11 miles to Glen summit, from which point the road leads downward 1400 feet in all to Wilkes Barre, a distance of 19 miles.

The train consisted of eight cars, two of them being parlor cars. Immediately after leaving White Haven a snowstorm commenced, which continued with greater or less violence during the trip. In spite of this severe drawback, the run to Glen summit was accomplished in just 20 minutes. From Glen summit to Wilkes Barre the run was made almost wholly by gravity, and was made in 33 minutes. The return trip occupied a somewhat longer time, owing to several stops. The train consisted of five heavy cars. The steadiness of the engine while running at high speed was remarkable, the motion in the cab, high above the rail, being scarcely more than that experienced in a passenger. —*Colliery Engineer.*

THE HEATING AND COOLING OF CAST STEEL.—It has been observed by Barrett, as recorded in the *Philosophical Magazine*, that if a bar of hard iron be allowed to cool from a white heat to dull redness, there is a spontaneous disengagement of heat, and its magnetic properties suddenly change. This phenomenon has been called recalcence; and M. Le Chatelier has also noticed that at about 700° C. there is a molecular modification of pure iron. In order, therefore, to see if recalcence is due to the heat set free by the modification of the iron, or if it requires the presence of carbon, M. Osmond has made a series of experiments which have been brought before the French Academy of Sciences. He operated with iron containing from 0.16 to 1.25 per cent of carbon. He has found the existence of two phenomena of the kind observed by Barrett. The first is due to the molecular transformation of the iron, the second is evidently recalcence, and corresponds to a change in the relations of the iron with its carbon. It takes place at 675° C., when thermometer suddenly stops and then rises to 681° C., afterward resuming its regular fall as the metal cools. This was observed with steel containing 0.57 per cent of carbon. With only 0.16 per cent of carbon a much lighter effect of the kind was noticed about

749° C.; this was probably due to this phenomenon noticed by M. Le Chatelier. With 1.25 per cent of carbon the two effects appear to confound themselves. When the proportion of carbon is increased, the temperature of transformation of the iron seems to be lowered and the temperature of recalcence raised, so that both come to coincide in hard steel. As a practical use of this discovery, M. Osmond proposes by this method to study the influence of impurities in steel.

The Advantages of Compound Locomotives.

Mr. V. Borries, the well-known German railroad engineer, makes the following statement on compounding in *Glaser's Annalen*:

The advantage of compound working may be stated as follows: In the ordinary locomotive with slide-valves and narrow ports, it is not very desirable to attempt more than three to four-fold expansion, and the steam is passed off at a pretty high temperature, which is utilized somewhat in the second cylinder of the compound machine. Furthermore, the shell of the cylinder naturally takes the mean temperature of the steam passing through it; and as the temperature of the expanded steam falls below this, it absorbs, before passing into the stack, a certain amount of heat from the cylinder shell, which has to be replaced from the entering steam. This operation in a compound machine takes place in the low-pressure cylinder only, since the heat absorbed by the steam from the other cylinder is utilized in the low-pressure one. The steam lost in the clearance spaces and in the leakage around the piston of the high-pressure cylinder is also utilized, and a more uniform pressure on the piston is attained for the same degree of expansion. With steam cut off at one-quarter stroke, the greatest force of the steam is exerted where it is least effective and produces more friction, while if we get the same expansion by cutting off at one-half and expanding into another cylinder, the action of the steam is obviously more effective. By the possibility of expanding two-fold, while giving full steam to one cylinder, and obtaining an eight-fold expansion by cutting off at one-fourth, greater and more profitable range is given to the engineman in graduating his cut-off.

With all these theoretical advantages, a practical average saving of fuel of 17.1 per cent over locomotives of similar construction with ordinary cylinders has been attained. This result is the average of the collective working of three compound engines—respectively freight, passenger and omnibus engines—working against seven different ordinary engines of similar class and weight, for periods of from three to nine months each. The boiler pressure carried on the compounds was 180 pounds, while that of the other engines varied from 135 pounds to 180 pounds. The valve-gear of these compound engines is just as simple as that of ordinary engines, the links for both cylinders being set by the same movement of the lever and not capable of separate adjustment. It is to be noted that in this system both slides receive together the pressure usually thrown upon one for a given quantity of steam used, causing less wear on the parts. Since the pressure on the pistons is more uniform throughout the stroke, and since the work is more equally divided between the pistons, these engines run very steadily; and this, with the smaller quantity of fuel burned, makes the repairs for machinery and boiler less than usual, in spite of the high boiler pressure carried. The great expansion of the steam diminishes the intensity of the blast so much as to cause little or no spark-throwing from the stack.

THE IRON PRODUCT OF THE WORLD.—It is worthy of remark that the United States was the only country in the world that made any notable increase in the production of pig iron in 1886 over the production of 1885, her increase being 1,640,017 tons. It is estimated that Russia increased her production 6000 tons, Spain 4000 and Austro-Hungary 17,000. On the other hand, the other principal iron-making countries of Europe show a total decrease of 920,225 tons, distributed as follows: United Kingdom 379,992 tons, Germany 411,972, France 102,495, Belgium 15,766, Sweden 10,000. Taking all the European countries named, they produced 893,225 tons less of pig iron in 1886 than they produced in 1885, while the United States, as stated, produced 1,640,017 more.

RAILROAD SLEEPERS IN INDIA.—The sleepers recently adopted by the Indian Government are of the transverse description to be used with the flange rail, and it is believed that the Indian Government have now pinned their faith to this particular kind of sleeper and rail as the results of experiments lately conducted when cast-iron sleepers and the old double-headed rail were put in competition with the newer designs. The rails weigh 75 pounds to the yard.

An engraving of Cunningham's new double-cylinder, reversing hoisting engine is given in the advertisement in another column. These engines are made for the Pacific Coast trade, with friction-brake, clutch, lever, etc., to adapt them to mining purposes, so the engine need not move when the load is running down. This engine has very few working parts and is simple in construction and operation.

SCIENTIFIC PROGRESS.

The Nature and Origin of the Elements.

It is very interesting to note that the tendency of the best scientific thought of the present day upon the subject of the nature and origin of the elements is unmistakably toward the view that these are essentially the same in respect to their ultimate constitution—that is to say, in being derived from a single material, and that the differences between them are due to secondary causes.

The opinion that the 60 odd different forms of matter which are recognized by chemists are so many distinct primitive forms of matter, was universally entertained until a comparatively recent period. It was, indeed, one of the fundamental ideas which clearly distinguished and marked the departure of modern chemistry (as developed by its great founders, Scheele, Priestley, Lavoisier and other worthies of the last century) from the vagaries of the alchemistic period of the science which preceded it.

The change of opinion on this subject, which has been slowly taking place during the past 20 years, is one of the most interesting examples of the kind that the history of science exhibits. As the case at present stands, the views of the leaders of thought in the chemical world are so far in accord with those of their predecessors of the alchemistic period, as to agree that the transmutation of one element into another is a thing which is not inherently impossible. This admission by no means involves the acceptance of the various crude and extravagant hypotheses of the alchemists, nor does it involve a belief in the claims—in those days generally believed—that the transmutation of the baser metals into gold had been repeatedly accomplished.

The modern view of the origin of the elements was admirably expressed in a most interesting address delivered at the last meeting of the British Association for the Advancement of Science, by Dr. William Crookes, F. R. S., one of the ablest representatives of science, whose remarkable researches in "Radiant Matter" have won for him an imperishable renown.

Dr. Crookes, in his address, treated of the question here under discussion—namely, whether the various so-called elementary substances (hydrogen, chlorine, iron, gold, etc.) are to be considered as ultimate and primitive forms of matter, or, rather, as different secondary forms of a single primitive form of matter. His conclusions are summed up in the final sentence of his address, as follows: "We cannot, indeed, venture to assert positively that our so-called elements have been evolved from one primordial form of matter; but we may contend that the balance of evidence fairly weighs in favor of this speculation." This hypothetical primordial matter Dr. Crookes provisionally terms "protyle." We shall revert further on to Dr. Crookes' view on this subject, and, meantime, give some little consideration to the reasons on which this general change of sentiment among chemists is based.

The principal reason is found in the fact of the division of the so-called elements into groups, the members of which resemble each other so closely that their separation and identification are often a matter of extreme difficulty. This inter-relationship would appear to be inexplicable on any other grounds than that of a derivation, by a process of "inorganic evolution," from a common source. The relationship of the elements above referred to has found its highest expression in the "periodic law" formulated by Mendeleeff and Mayer, by which it is shown that when the 60 odd elementary bodies are arranged in the order of their atomic weights, beginning with hydrogen (the lowest) and ending with uranium (the highest), they form a series of groups, the chemical and physical properties of which are closely related, and vary with great regularity. According to this "periodic" law, Mendeleeff elaborated a number of hypothetical series, into which all the known elements were naturally grouped. A number of members of these series, however, were missing—that is, there were no known elements which conformed to them. Nevertheless, he indicated their positions in the series, and ventured to predict what their physical and chemical properties should be, and, remarkable as it may appear, those predictions have been verified in at least three cases, namely, in the case of gallium, scandium and germanium—three elements which have been discovered during the past few years. In each of these cases the newly discovered element fitted so perfectly in its appropriate place in the break in the Mendeleeff series that the significance of the periodic law as the expression of an order of nature is no longer a matter of doubt.

The existence of compound radicals, such as cyanogen, ammonium, etc., which, though they are compounds, are in all respects analogous in their chemical behavior to elements, and the so-called allotropism of certain elements, in virtue of which carbon, for example, exhibits itself to us in three distinctly different conditions, oxygen in two, etc., are inexplicable on the assumption that our so-called elements are essentially different in their ultimate constitution.

That there is a remarkable connection of some kind between the elements, the foregoing facts clearly demonstrate. Just what it may be, we are, in the present state of our knowl-

edge, unable to determine demonstrably; but by analogical reasoning we would seem to be justified in accepting this relationship as evidence of a derivation from the same primordial substance.

In conclusion, it may be of interest to quote from Dr. Crookes' address a passage embracing his speculations as to the manner in which the several elements may have been derived from his hypothetical "protyle," on which point he has the following:

"Of all the known elements, the one of simplest structure and lowest atomic weight is the first to come into being. For some time hydrogen would be the only form of matter (as we now know it) in existence; and between hydrogen and the next formed element there would be a considerable gap in time, during the latter part of which the element next in order of simplicity would be slowly approaching its birth-point. Pending this period, we may suppose that the evolutionary process which was soon to determine the birth of a new element would also determine its atomic weight, its affinities, and its chemical position. In the original genesis, the longer the time occupied in that portion of the cooling down during which the hardening of the protyle into atoms took place, the more sharply defined would be the resulting elements; and, on the other hand, with more irregularity in the original cooling, we should have a nearer approach to the state of the elemental family such as we know it at present. In this way it is conceivable that the succession of events which gave us such groups as platinum, osmium and iridium, palladium, ruthenium and rhodium, iron, nickel and cobalt, if the operation of genesis had been greatly more prolonged, would have resulted in the birth of only one element of these groups. It is also probable that, by a much more rapid rate of cooling, elements would originate even more closely related than are nickel and cobalt, and thus we should have formed the near-allied elements of the cerium, yttrium, and similar groups; in fact, the minerals of the class of samarskite and gadolinite may be regarded as the cosmical lumber-room where the elements in a state of arrested development—the unconnected missing links of inorganic Darwinism—are finally aggregated."—*Manufacturer and Builder.*

IN A CHANGING WORLD.—Geologists have described Britain as swarming with a multitude of forms of gigantic reptiles, some of them 60 feet or more in length, during the reptilian age—the middle period in the earth's geological history, when mollusks and reptiles attained their culmination and declined, and when the first mammals and the first birds appeared. A striking picture of England at a later epoch—the middle of Quaternary—is given by Owen: "Gigantic elephants, of nearly twice the bulk of the largest individuals that now exist in Ceylon and Africa, roamed here in herds, if we may judge from the abundance of their remains. Two-horned rhinoceroses, or at least two species, forced their way through the ancient forests, or wallowed in the swamps. The lakes and rivers were tenanted by hippopotamuses, as burly and with as formidable tusks as those of Africa. Three kinds of wild oxen found subsistence in the plains. There were also gigantic deer, wild horses and boars, a wild cat, lynx, leopard, a British tiger larger than that of Bengal, and another and even more terrible carnivorous monster with saber-shaped canines eight inches long. Troops of hyenas preyed upon dead carcasses and feeble quadrupeds. There were a savage bear larger than the Rocky Mountain grizzly, a gigantic beaver, wolves, and various smaller animals, down to bats, moles, rats and mice."

MANUFACTURE OF CARBON.—The following item, says a correspondent in the *Electrical World*, I have picked up, and it ought to be of interest: "The manufacture of carbons for electric lights has become an important business. At a trial in Cleveland for alleged infringement of patent, a witness testified that 150,000 carbons burned daily in the United States; 100,000 are manufactured in Cleveland, where there are 20 furnaces. The carbons are made chiefly of the residuum of oil after it has been refined, but the deposit about natural-gas wells is also coming into use. The material is ground to a powder, a little pitch is added, and the substance is then placed in molds. These are packed in boxes and the latter placed in a furnace, where they are subjected to the most intense heat. The capacity of an ordinary furnace is 45,000 carbons. Through the use of a movable furnace roof, the patent on which forms the subject of contention, two furnaces are constructed side by side, and while the carbons in one are being burned, the other is loaded with boxes of molds. Under this system, two men load a furnace in one day, the carbons are thoroughly burned in five days, and the cooling process continues only 24 hours."

SEPARATION OF IRON FROM CHINA-STONE BY ELECTRICITY.—At Par, Cornwall, a process described as the "extraction of iron from China-stone by means of electricity" has been for some time under experiment by the St. Austell Mining Company, and plant is now being laid down for the permanent application of the process upon a commercial scale.

TELEPHONES IN ENGLAND AND IN THE UNITED STATES.—This country has over a quarter of a million telephones in use. England has only 13,000.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

BRET-PULLER.—Robert R. Barrows, Potter Valley, Mendocino Co. No. 361,205. Dated April 12, 1887. This is a garden implement specially adapted for the pulling of those vegetables having roots or bulbs which grow in or partially in the ground, such as beets, turnips, carrots, etc. The invention consists in a handled blade adapted for gripping one side of the vegetable and a peculiarly curved fulcrum lever pivoted to the main handle or blade, and having a blade adapted for gripping and binding on the other side of the vegetable. The distinguishing feature of this implement lies in the employment of an auger lever which enables its foot to act as a fulcrum, and concave blades adapted to enter the ground and grasp the root or vegetable.

GRAIN-DRIER.—Lewis Borland and T. J. Parsons, S. F. No. 361,126. Dated April 12, 1887. The grain is put in a garner or hopper, and thence passes down its throat, completely encircling the steam heater, so that in its passage it receives the necessary preliminary heat. The throat being perforated provides an escape for the heat so there will be no condensation and the grain will not be moist. The entire operation of the drier is automatic, there being no shoveling necessary. By the arrangement of hot air chambers the grain, as it passes the upper series, receives the heat directly on one side, and as it passes the lower series receives it directly on the other, so it never has to be turned.

COOK STOVE OR RANGE.—Francis Jackson, Oakland, No. 361,064. Dated April 12, 1887. This patent has been issued for certain very important improvements in cook stoves and ranges by which a great saving of fuel and economy in the application of heat to the different parts of the stove or range are obtained. One of the principal features of the invention is the series of hinged adjustable grates, which may be tilted so as to increase or decrease the capacity of the fire-box, which enables the user to make as large or small a fire as may be necessary for various purposes; in connection with this a curved-end grate or grates, within the vertical bars of which the ends of the fuel-supporting grates are moved, and in connection with these supporting grates are levers extending outside the stove so that they may be easily raised or depressed. The products of combustion pass through passages or flues down beneath the oven, thence up around its sides and over the top of the stove through proper regulating passages or dampers, which enable the operator to regulate and adjust the heat at will. The sides surrounding the oven are made in corrugated or wavy outline, which considerably increases the heating surface, and a scraper which is made to fit this outline is easily moved backward and forward by exterior knobs or handles, so that all soot or ashes or other deposit can be easily removed by one motion of the scraper back and forward. There are many details of construction which could not be well explained without an engraving, and which go to make up a very perfectly operating range, and one which promises to take an important place in household economy.

PROFESSIONAL FATIGUE.—Medical and other professional men often break down from their inability to keep a regular time for meals. An eminent doctor says: "Being often out for many hours, and becoming too exhausted to digest a full meal when at length able to get it, I conceived a plan which answered admirably well, and which other doctors have gladly adopted. I provided myself with a small bottle of lime-water, which I add to a glass of milk when passing a dairy shop; or I put a small flask of the mixture in my pocket. A water biscuit with this will keep a man harmless on a long fast, and enable him to digest a meal when he can obtain it."

THE LARGEST MINE-EMPLOYER.—It is said that W. L. Scott, of Erie, Pa., employs no less than 10,000 men in and about his many coal mines. This would make him the largest individual employer in the coal industry of the world, a position similar to that occupied by Krupp, of Essen, Germany, in the iron industry, the number of whose employees is said to be 26,000. Who that has ever studied the history of these two giants in the industrial world but must admire the indomitable energy and enterprise which characterize both men; yet who can help but wonder at the dissimilitude between the two in the management of their vast army of employees?

DRAW-GATE.—S. T. Coulter, of Santa Rosa, Past Master of the State Grange, has invented a draw gate that has many excellent features for opening and closing. He has placed one on his farm at the main entrance, which has been in practical use for some time. Any person can open and close the gate with but little effort while sitting in a buggy. We expect soon to illustrate this gate with full description in the *Rural Press*. From a cursory examination, it seems to be in cost and adaptability one of the best if not the best gate that has been placed before the public.—*Pacific Rural Press*.

GOOD HEALTH.

Bathing, and Why We Should Bathe.

Among all the appliances for health and comfort to mankind we may safely say there is nothing so well known, so useful, and withal so comforting, and yet so little practiced, so carelessly and thoughtlessly neglected, as judicious bathing. The skin of the human body, from head to foot, is a network of pores. One cannot put a finger on a single place without covering several hundred little openings, which ought always to be kept free and clear of obstructions. As evidence of the truth of this statement, we need only call to mind the great drops of sweat so often seen gathering on one's face and other parts of the body in warm weather, especially during the time of over-exertion. These pores are the openings into minute tubes or channels, which lead through unseen meanderings into the sanctum of life within.

The dust which comes into contact with animals covered with hair is mostly kept out, and the perspiration conducted away from the pores of the skin by those hairs; hence bathing is not so essential with them as with mankind, whose bodies are practically denuded of such protection. The glutinous mass of perspiration, dust and filth which gathers on the surface of the body naturally covers and clogs the pores, and often enters them and poisons the system. To remove that filth, frequent ablutions and occasional immersion in water are exceedingly desirable, and usually indispensable to health and comfort; consequently, every family should have a convenient bath—and a full bath too—of some kind, not only for general neatness of person, so desirable to every individual of taste and culture, but as a means of preserving health, and in many cases, especially under the advice of a good physician, as the easiest, pleasiest and one of the most powerful and efficient means of combating disease.

Directed by good judgment and wise counsel, a bath is a valuable auxiliary to other remedies, and it can be used when internal remedies cannot. In the long catalogue of diseases to which flesh is heir, scarcely one can be named in the treatment of which a bath is useless. To those blessed with good health, a bath, as a common-sense appliance, gives thrift and growth to healthy functions, a brightness and delightful serenity, a clearness of mind and buoyancy of spirit. It is certainly a blessing to both mind and body. For the mental worker it is a nerve tonic. A thorough immersion in water of proper temperature will calm and give strength and tone to his whole system. The indoor laborer, who gets but a scanty supply of fresh air, needs a bath to obtain those invigorating elements so common in the open air. The outdoor laborer, especially the farmer, who works with heroic energy all day long, unavoidably gathers on the entire surface of his body a complete prison-wall of dust and thickening, gummy perspiration; and when his day's work is done he needs then, more than any other thing, not only a wash, but a good, luscious, full bath to fit him for a clean bed and a refreshing sleep.

Finally, every one needs a bath at times, and every human habitation should contain something for a complete immersion in water; and since convenient and efficient portable baths at comparatively low figures are now extensively advertised for sale, there is little excuse for any one to be without this priceless benefit.—*Western Rural*.

Mercury in the Human System.

Very elaborate experiments have recently been made by Dr. Welanders to determine how mercury is absorbed by and eliminated from the human system. Some of the tests for determining the presence of mercury were so fine that it was found in a solution of corrosive sublimate of one in 10,000,000.

The character of the experiments may be learned from the following results as reported in a German medical journal:

When mercury is given by the mouth, it appears, as a rule, in the urine one or two days later. Administered through the anus, it was already found the following day. When applied through the skin, it appeared likewise, as a rule, on the following day in the urine. Mercury is rapidly absorbed by wounds and ulcers.

Injected under the skin, mercury is very rapidly absorbed, and appears often in the urine as early as one or two hours after the injection.

Mercury is constantly eliminated with the urine; a very great part, and perhaps the greater part, of what has been introduced into the body leaves it in that way.

The salivary glands play quite a secondary role in this respect.

The faeces, on the other hand, contain constantly mercury, and often in considerable quantity.

Mercury is likewise eliminated with the milk, and was found in the urine of the nursing.

The elimination takes place in proportion to the amount introduced.

Welanders discredits the statement of Paechie and Vajda that mercury may remain for 12 or 13 years in the body. He has, as a rule, found it 4 or 6 months after the end of the treatment; frequently it is found from 6 to 12 months, and sometimes even more than a year, after the treatment has been discontinued.

Welanders thinks mercury circulates in a soluble form with the blood. He found it in abundance in this fluid in every case examined. He found it likewise in pus taken from patients treated with mercury, and in ascitic fluid.

This conclusion is drawn for practice from these experiments is that when a rapid and powerful effect is aimed at, the administration of mercury by hypodermic injections is preferable, while for the intermittent treatment of Fournier the mercurial pills will do as well.

Treatment of Bright's Disease.

The increasing prevalence of this disease renders any general information in regard to it, coming from an authoritative source, of considerable interest. We give the following from Semmola, of Naples, taken from an article published by him in the *Wiener Medizinische Blätter*. He advises strongly against allowing a patient who is suffering from nephritis to come in contact with cold in any avoidable way. Such patients are excessively sensitive to cold, and cold baths are followed by great shock and depression. Violent massage and exercise of the muscles the author also strongly deprecates as followed by great shock and weakness.

He would advise the patient to live in a dry and equable climate; to strictly avoid all exposure or going about in severe winter weather; to practice mild gymnastics in a comfortable room rather than venture into a temperature below 18 or 20° C. The author emphasizes the remarkable sensibility of the skin of the sufferer with Bright's disease to all variations of temperature. Sodium iodide and chloride is advised in doses as large as tolerated. When, after two or three weeks, albumen has not entirely disappeared and dropsy has been relieved, phosphates of sodium or calcium are given in quantities as large as 40 grains or a dram daily. The efficacy of these drugs the author believes consists in their power to promote the assimilation of albumen.

The methodical inhalation of oxygen, which Semmola has urged since 1867, has been repeatedly proved to be of the highest benefit. Albumen soon disappears after its use, and although casts may remain in the urine, the patient's general condition is so much improved that the author thinks we have here an argument for the dyscrasic or hæmatogenic origin of Bright's disease.

All astringents are considered not only valueless, but also injurious. Especially is the action of ferrum sesquichloratum and plumbum acetatum thought injurious, because of their astringent influence on the capillaries of the skin.

USEFUL INFORMATION.

Cocoa-Nut Fiber in Electric Piles and Accumulators.

The combination of the negative and positive electrode of each element with a plate of cocoa-nut fiber, or a plate of compressed powdered cork, saturated with the required chemicals, in substitution for the usual exciting liquid, is proposed by Mr. J. Crosse, of Paris. The elements thus formed as above are either placed in a suitable box of wood, cardboard or other non-conducting material, and a spring or other mechanism caused to press on the last plate to keep the whole in close contact, or they may be superposed in a vertical frame, or threaded on a cord fastened to the lowest plate, and passing through the center of the diaphragm, and of the second plate, and thus through the series of elements, in which latter case the weight of the elements acts in place of the before-mentioned spring. The use of these diaphragms enables the exciting chemicals to be used more concentrated, owing to the absorbing power of the cellulose in the cocoa fiber, and also produces a more equal wearing of the surface of the electrode. They also enable jars of glass, of porcelain, etc., to be replaced by wood, or even to be omitted altogether, giving thereby greater lightness and portability.

The fiber plate is saturated with the exciting and depolarizing agents preferably in such a manner that the former is brought into contact with zinc or other metal to be dissolved, and the latter with the electrode of copper or corresponding metal. When zinc and copper are used the fiber plate may be saturated with acidified water on the one side, and with solution of sulphate of copper on the other, or two fibers may be saturated, the one with acidified water, the other with the solution of sulphate of copper; and these two plates placed together to form one plate used as described. The fiber plates may be fed with the necessary solution or solutions by means of a tube or tubes from a reservoir, having orifices at suitable intervals, so that the fresh solution may drip on to the upper part of the fiber plates, also a trough, or the like, may be arranged below the plates to receive the used solution falling therefrom. In place of cocoa-nut fiber, powdered cork, or sawdust, or similar woody fiber may be used, the same being compressed in plates and saturated with the necessary chemical reagents. Or the plates may be made of a mixture of the said woody fiber with cocoa-nut fiber.

IMITATION DECORATIVE STONE.—Excellent imitations of stone, marble, terra cotta and such-like, for the decoration of buildings, for

statuary and other purposes, are produced by the process invented by Mr. D. Cottier, of Regent's Park, London. He applies powdered sandstone, freestone, brick, terra cotta, granite, onyx or marble, sand or dust, to any interior or exterior architectural work, either curved or plain, or to buildings or structures of all sorts, or to statuary, or ornaments made with stone, brick, plaster, terra cotta, cements of all kinds, or to stucco or other like compositions. The powder or sand of any of the above-mentioned substances is caused to adhere to the surfaces by means of paint made with oils, spirits, tars, varnishes, or other sticky materials which are insoluble in water. The powder, or sand, or dust is to be put on by a dredger, or thrown by hand instrument made for the purpose, or by an air blast, or engine driven by hand, water, gas, steam or electricity, or otherwise. It is claimed that work so done will withstand the wear and tear of climate and weather better than any simple paint, while at the same time the natural and artistic effects gained will be evident to all. By its application to the reproduction of stone or marble statuary and ornaments, the self-same look of the originals can also be given. In these cases the stone or marble would have to be reduced to a very fine powder.

Uniting Platinum With Other Metals.

An improved method of uniting platinum or silver and nickel or alloys of these metals in the manufacture of compound plates, wires, and the like has been introduced by La Société de Laminage du Nickel of Paris. The surfaces to be united should be as clean as possible and be filed, planed, or scraped, in such a manner as to facilitate an excellent contact of the two surfaces at all points. The nickel must, moreover, be in such a condition of malleability that the hammering or rolling which terminates the operation can complete the intimate contact of the metals. The surfaces to be united are powdered with any soldering flux, such as borax, and the two pieces are then subjected to a suitable temperature to render them sufficiently malleable for enabling the said pieces to be finally welded by hammering or rolling. In some cases the contact surface of one of the pieces can be electro-plated with a metal which, when the said pieces are placed together and heated, will constitute a solder.

In order that the welding shall succeed it is necessary to prevent the air from coming into contact with the said surfaces, which air would oxidize the red-hot nickel. For this purpose the following process can be employed, which process consists in previously inclosing the metals to be united in thin sheath or envelope of sheet iron, copper, or other metal capable of withstanding the heat. When, after suitable heating and hammering, the metals are united, the metal sheath or envelope is removed by scouring or scaling, or in any other manner. It is sufficient to fold the envelope closely around the pieces to be united in order to render it air-tight.

With the object of avoiding the union of the sheath or envelope with the metals to be united, they coat the said sheath or envelope on its internal surface with a layer of magnesia, lime, oxide of zinc, or other substance having similar properties, in order to prevent the internal contact of the envelope with the metals to be united. When the union of the pieces is once effected, the envelope can be easily removed. If desired, nickel wires can be coated with platinum in the manner hereinbefore described. In this case the platinum covering is bent into the form of an open tube which is closed around the nickel after the latter has been inserted therein. Nickel plates and wires coated in the manner hereinbefore described with platinum, or silver, or alloys of these metals, are adapted for the manufacture of receptacles and utensils which are of use in pharmacy, in chemical laboratories, and in certain industries, by reason of their perfect resistance to the action of acids and alkalis.

STAINING AND FINISHING COMMON WOODS.—A correspondent of the *Wheelwright* desires to know how to stain and finish common woods in imitation of walnut. He does that kind of work, but it looks dingy and black and not at all nice. The answer is given as follows: To stain common woods, as pine, whitewood, ash, oak, etc., to imitate black walnut, take burnt dry umber and mix it with stale beer or with water, to which a little sugar has been added; rub the wood over with the solution, using a sponge or rag, and then varnish when dry. Another excellent stain to imitate black walnut is made by taking 2 quarts of rain-water, adding 3 ounces cal-soda, 4 ounces vandyke brown, and one-half an ounce of bichromate of potassa, and boiling the mixture for 15 or 20 minutes. It can be applied with either a brush or sponge. When dry, varnish (hot or cold). Woods that are stained will finish up nicely if the first coat of varnish be shellac varnish, as that having a spirit varnish assimilate better with the stain coat and enriches it. Beside, it prevents the copal finishing or rubbing varnishes from striking in.

TESTING COALS.—A simple means for testing the value of different kinds of coal would fill the proverbial "long-felt want." It should be something that any man of ordinary intelligence can use and understand, and from which he can obtain results accurate enough for practical purposes.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador Ledger, April 23: At the depth now reached in the Wildman shaft is found to be only three feet wide, which necessitates considerable work in enlarging it. So far they have made the enlargement from the footwall side, and in so doing have encountered a body of quartz of good quality. The Mabony is still running 40 stamps. The copper plates have been widened to five feet, and the sluices have been copper-plated their entire length. A party of Italians, working a gravel mine a few miles up the creek, took out a chunk of gold worth at least \$100. It was found about three feet from the surface, round in shape, and perfectly smooth. The new pipe for the Amador canal is making rapid headway. Over one-half of it is finished and ready for laying. The company has a force of men at work digging the ditch between the Kennedy mine and the canal, and the work of laying will be commenced next week.

COPPER.—Amador Dispatch, April 23: Work was commenced on the Newton Copper mine, between Jackson and Lone, a few days since, pumping the water from the shaft, preparatory to taking out ore. A new process of working will be adopted, by which it is thought this mine will be made to pay very handsomely. The work, which has been carried on at these works for some time past, has been principally, we understand, the placing of old iron, etc., in the copper water, and then save the metal which is accumulated and formed thereon. It is said that the ore in this mine is of a very good character, and we believe it will pay to work it on an extensive scale.

GOVER.—Amador Ledger, April 23: This mine is looking better than for some time past. They are making extensive improvements in the shape of additional machinery. The mill has shut down a few days to enable a new Knight wheel to be placed in position. It is the intention to put in Frue concentrators shortly, and also a rockbreaker. Some remarkably rich ore was extracted last week.

MISCELLANEOUS.—It is reported, on good authority, that the Hardenburg or Casco mine, at Middle Bar, has been sold to San Francisco parties, and that the south extension, owned by Mrs. Sargent, is also likely to be sold to the same parties. The Hardenburg has been idle for many years. The resumption of work on this property will be hailed with pleasure by the residents of Middle Bar and vicinity. At the McKenzie Bros.' mine, about five miles east of Jackson, affairs are wearing a very flattering outlook. They have two claims. In one a ledge from five to seven feet wide exists. The ore is of very high grade, assaying as high as \$100 per ton. It is of a rebellious nature, however, and cannot be worked by ordinary mill process. A mill has been shipped from San Francisco to be erected on this claim. This is for the purpose of reducing the ore to pulp, all of which will be saved and sent either to San Francisco or Denver for treatment. Satisfactory arrangements have been made with the railroad companies for the transportation of ore at reduced rates. A large quantity of 15-inch pipe has been made which is intended to bring water to both claims. The Bunker Hill paid its employees last week the two months wages due them. This is satisfactory evidence that the bullion production is on the increase. The work of retimbering the old shaft of the Original Amador has been commenced. It is to be retimbered for 700 feet. A Bryan roller quartz-mill is expected up this week. Messrs. Reed & Askey made a cleanup at their small mill near Irish-town, last Tuesday. The yield was \$7 per ton, which is enough to pay the running expenses. At the Amador gold mine sinking is progressing at the rate of two feet per day; the rock is soft and blasts easily. W. A. Nevills and Capt. Nichols went to San Francisco Tuesday morning to meet Senator J. P. Jones, and arrange matters, if possible, in regard to the big tunnel. George Thomas has been engaged as foreman of the quartz and copper mine at Campo Seco. Water-power hoisting machinery is to be placed over the north shaft of the Kennedy mine.

Butte.

BIG BEND TUNNEL.—Record, April 23: Mr. Harris, the superintendent of the work of enlarging the tunnel at Big Bend, is of the opinion that the work will be completed in August, and that mining in the channel will be commenced in the fall. Of course it will be too late to do a great deal before next winter's rains commence, but enough will be accomplished to test the wealth of the channel. He is confident of rich returns from the mine, and all old river miners agree that the Bend is rich in gold. In places, where it was mined in early days, it proved to be fabulously rich, and not one-hundredth part of the channel has ever been thoroughly mined.

Calaveras.

WILL RESUME OPERATIONS.—Calaveras Chronicle, April 23: The What Cheer gravel mine, which has lain idle for some time, will be reopened again, work commencing next week. Mr. John Brackett, one of our most experienced gravel miners, having an experience of over 30 years in that character of mining, has been given the superintendency of the operations.

El Dorado.

THE ALPINE.—Mountain Democrat, April 23: The Walker Brothers, of Salt Lake, who it was reported were about to purchase the Slate Mountain mine, were at Georgetown and vicinity last week, and decided not to purchase that property, but to put work on other properties they own in the county. It is reported that they will soon do extensive work on the Alpine mine, near Georgetown. F. R. J. Dixon is pushing work ahead rapidly on the Revenge mine at Greenwood, and is now working a day and night force. T. G. Elty, of Greenwood, has recently discovered and located a quartz ledge near Greenwood, which is showing up well, and which is so promising that arrangements are being made to sink a shaft and develop the property. The old Shaw mine near El Dorado, which in days gone by has been such a rich producer, has, we hear, been bonded to Mr. Morgan of the Volante, and others, who will again work the property. The Independent mine, near El Dorado, recently purchased, is at once to be operated by new owners.

Capt. Staples is doing some work on properties in the vicinity of El Dorado, and we hear has several enterprises on foot. He will soon open out several properties in that vicinity. The El Dorado mining district is having a decided boom at present. The new quartz-mill recently brought up from Amador county for erection at Poverty Point is nearly in place, and will soon be in running order. The parties interested have moved up from below and are now living on the claim. Work is being pushed on the property, and soon the clatter of stamps will be heard.

LUCKY.—Georgetown Gazette, April 23: Two miners, who claimed to be greenhorns at the business, brought in to one of our merchants a few days ago about \$26 in gold as the result of a day's prospecting, one piece being worth \$18. We did not learn names of the parties; they are working at the Burnham mine and were out panning while the mill was temporarily shut down. A week since, Dr. Spencer, or rather his foreman Cad and George, struck in the face of their tunnel a large stream of water which came out in great force, causing a suspension of work for a time. The flow continued unabated for two days, since which time it has steadily flowed a five-inch stream. The tunnel is in over 100 feet, and if the water continues to increase in the next 200 feet as it has in the first 100 feet, the doctor will have enough water to run his contemplated quartz-mill.

Fresno.

HILDRETH.—Fine Gold Miner, April 22: The work of development in the Francis-James mine still continues and the results are in every way satisfactory. As depth is attained there appears to be an increase in the value of the sulphurets, while the ore carries the usual amount of coarse gold, and it is supposed that 10 more stamps will soon be required at the mill, as well as additional concentrators. Its successful development is another teststrike for the camp. Supt. Wallis, of the Hildreth mine, is meeting with success, and ore full of free gold is constantly being hoisted to the surface. The new ground opened up since Mr. Wallis assumed the superintendency has given results second to no other mine in the district, and that the yield of bullion will well repay the enterprise of the management there can be no doubt. In the face of the east drift on the second level there is two feet of solid quartz showing considerable coarse gold, and improvement is noticed as the mine is pushed forward. The ore taken from this point in the mine will mill from \$80 to \$100 per ton, including sulphurets. Everything around the Abbey mine presents a lively appearance, and work goes on in the same steady way as usual. The mill is crushing ore taken from the upper levels. The ore maintains its accustomed richness. The tunnels in the Morrow mine are being driven ahead rapidly, and in tunnel No. 3 a fine body of high-grade ore has been encountered. Mr. Morrow has leased the Hanover mill and will shortly put through 500 or 600 tons of ore. The favorably situated Rough & Ready mine, owned by F. Knoblock and the Baker Bros., of Fresno City, is looking up. Prospecting is being done with satisfactory results, the ledge holding its own in size and quality. The ore from actual milling tests runs \$35 a ton with rich sulphurets. Mr. T. Scully reports everything lovely at the Cascade mine. While opening up new ground in the tunnel there is a marked increase in the percentage of sulphurets, which have been demonstrated to be very rich. Considerable prospecting is being done, not only around the Hildreth, but also in the vicinity of the White Rock mine, and we understand that several good finds have been made. H. Towers and Jas. Kirby have struck some fine ore in the White Bear (an extension of the Hanover), and more favorable results are anticipated upon development. Louis Wilson will soon start sinking upon his ledge, seeing what water he has to contend with is surface seepage only. The ore in the sump is two feet wide. Upon the foot and hanging-wall a vein of clay gouge follows the ledge that also prospects well. From the satisfactory returns of the 25 tons worked at Smith's astrata, Smith will have the working of all ore from this property hereafter. Harry Lee and Byrnes have one of the best prospects east of the McNally mine, and we understand Robinson & Clark have secured the extension. As the ore is brought to the surface it is run through their astrata and pays \$30 to the ton. The sulphurets run off in the tailings.

Inyo.

MODOCK DISTRICT.—Inyo Register, April 21: Mining is very active in this district, there being 22 men at work at the Modock and Minnieta mines. Frank Fitzgerald has shipped 94 tons of high-grade ore to San Francisco since the 2d of March, besides sending 105 tons to the furnace. Smith & Wallace have three carloads of rich ore sacked for shipment at the Minnieta. Coal and wood are being delivered at the Modock furnace, and Fitzgerald will fire up about the 20th of May, for a run of 15 days at least.

Mono.

BODIE.—Upraise from the north drift, 700-foot level, was driven 13 feet. The Bodie and Mono joint winze was sunk 12 feet in broken vein matter. The east crosscut, 900-foot level, was extended 36 feet. The water is down below the 900-foot level 63 feet.

MONO.—West crosscut, No. 2, 800-foot level, was driven during the week six feet in hard rock. The east crosscut from the south drift was extended 18 feet. The joint Mono and Bodie winze was sunk 12 feet, and shows no change.

STANDARD CON.—Ore shipped to mill for the week, 308 tons. Mill running steadily. Bullion shipment was made on Wednesday, the 20th.

Nevada.

MILL.—North San Juan Times, April 22: The General Grant Mining Company is making preparations to construct near the mine a ten-stamp mill and to run a tunnel to tap the ledge 500 feet below the surface. The company is incorporated. The mine is believed to be a good one. The owners are abundantly able to develop it, and as they are men of push and perseverance the mine will be developed rapidly.

COE MINE.—Grass Valley Union, April 26: Good progress is being made toward the erection of the new pumping and hoisting works on the Coe mine, and Mr. A. W. Stoddard feels confident that he can start to pumping by the 1st of June. The works will be driven by water-power, a pressure of 220 feet being obtained. The water will be brought from the main canal on Town Talk ridge by means

of a ditch to a reservoir on the high ground west of the Nevada road, and from thence, a distance of 1800 feet, a pipe-line will be laid to the works. Ample power will thus be secured for doing the work required.

Placer.

ORO FINO.—Placer Argus, April 23: J. E. Shea is hard at work on his quartz mine, known as the Oro Fino, and will probably ere long reap a golden reward. The mine, which is about three-quarters of a mile from town, this side of Baltimore Ravine, was located eight or ten years ago by a Mexican named Manuel, who took some very rich rock out of the surface at various places. The mine since then has been prospected by means of an incline shaft on the ledge, and the vein which runs in an east-and-west direction is three feet wide at the bottom. A drift recently begun has been run westwardly some 60 feet in the expectation that it will strike the pay chute. It is in good ore—ore which is uncommonly rich in sulphurets. During the past week a whim has been erected for the purpose of facilitating hoisting operations.

SALE OF A QUARTZ-MILL.—Placer Herald, April 23: The old Pioneer quartz-mill, at Ophir, which was built originally as long ago as 1853, and which has always been run as a custom-mill, was sold a few days ago by Messrs. Lavalle & Hanson to Johnson & Kidd, of San Francisco, who have also bought the Plate ranch and mine. The purchasers have already gone to work to refit the mill throughout, and to add concentrators and other desirable improvements. They will put up also, in conjunction with the old mill, the Wiswell roller-mill, and thus be able to give customers their choice of either system.

Shasta.

POTOSI.—Shasta Courier, April 23: The resumption of work on the Potosi mine at Muleton, seven miles south of Shasta, which mine has been idle for about 20 years, gives rise to lively anticipations. A mill of very crude pattern was placed on the mine some 25 years ago, and the works were run in a wretchedly slipshod manner, but the rock worked averaged \$60 to \$75 to the ton, and the last few tons worked yielded \$90 per ton. The striking of a large body of water in the shaft caused the flooding of the mine, and as no adequate pumping machinery could be procured within the means of the stockholders, the works were doomed to lie idle. John P. Jones finally became proprietor, secured a patent to the mine, and has let it lie idle on account of having "too many irons in the fire." The ledge is well defined, from two to four feet in width from the surface to the bottom of the 66-foot shaft, and it is the opinion of all who have owned in or worked in the claim that it is one of the best and most promising in the county. Senator Jones also owns the Clear creek canal, 40 miles in length, which cost \$100,000. This canal is three feet on the bottom, built with sloping banks, and intended to carry a depth of three feet or thereabouts of water. The great hegira of miners from this county to Montana, Idaho, and other gold fields, and the slight development of quartz and agriculture and horticulture on the scope of territory covered by the canal, caused a temporarily limited demand for water; and, therefore, when several of the large, high flumes went down before the forest fires and storms, 30 miles of the canal was left to utility. The vast placer, quartz, agricultural, viticultural and horticultural possibilities and realities under the line of this canal, plead and languish for its restoration and the renewal of the water flow. It is ardently hoped that Senator Jones will not only go ahead with his Potosi mine, with new machinery, but will also restore to practical use the most valuable water right in the county.

BULLYCHOOP.—Cor. Shasta Courier, April 24: Bullychoop has an altitude of 7200 feet, and is a portion of the range dividing Shasta and Trinity counties. Taking Cleveland as a central point, the quartz deposit seems to run northwesterly to north fork of Indian creek, distance of nearly eight miles, and southeasterly near eight miles of Sunny Hill, the last named eight miles being on the Jerusalem slope. Near one-half of the first eight miles mentioned is located, and several claims patented.

DEVELOPING.—Courier, April 23: The work of developing the Wm. T. Coleman mines this side of the Dingee place, and three miles from town, is going on at a lively rate. A boarding and lodging-house has been erected for the employees, and as large a force of men as can be worked to advantage is busily engaged on the mine. Other buildings, and probably machinery, may soon be added.

Sierra.

MILL.—Mountain Messenger, April 23: Twelve stamps are running at the Cleveland quartz mine, Sierra City; 33 men employed. A. W. Crowell is superintendent, Martin Carroll, clerk, and George Black, head amalgamator. The upper main tunnel is in 578, and the lower one 665 feet. Yield of the ore is good. Altitude of the ledge about 4500 feet above the sea. Twenty stamps in the old Hitchcock mill, of the Sierra Buttes Co., are being refitted to crush the ore left in the dumps at the upper part of the mine.

Siskiyou.

PICK AND PAN.—Yreka Union, April 23: Gov. Daggett finished crushing at the Black Bear last week. Over 520 tons of rock were bailed from the mine to the mill since last July. It is estimated that the rock will yield at least \$40 to the ton. Mr. Daggett is now straightening up his short line railroad, and when it is completed will run quartz to the mill by a little donkey engine. The mines at Scott Bar are looking promising, to say the least. The Quartz Hill Co. is working day and night. J. Brunt & Co. have pumped out their drift and are on to good pay. The Klamath river mines are working, except the Fort Jones. The season bids fair to be prosperous in this section. The Centennial is washing good gravel, and the pay channel has been struck in the Phil. Mott. Fifty ounces of dust was taken out of the Quartz Hill claim at Scott Bar in one day last week.

NEVADA.

Washoe District.

CON. CALIFORNIA AND VIRGINIA.—Enterprise, April 23: On the 1435 level still continue stopping out ore from the bottom of winze No. 2, 165 feet south from the south line of the Ophir mine. Are still injecting the carbonic acid gas into the burning

section at the rate of 40,000 cubic feet a day. A second gas furnace will probably be set up, which will shorten the operation of extinguishing the smoldering fire. The usual amount of ore is being hoisted, and the average assay of battery samples is about the same as last week.

OCCIDENTAL.—In the upper tunnel on the 48 level the south drift from the north incline winze was extended 10 feet; total length, 203 feet. In No. 3 east crosscut the station is completed and sinking begun. Extracted 12 tons of ore from the 100 level. On the 90 level, in the lower tunnel, the north drift from No. 2 upraise was extended 12 feet; total length, 181 feet. West crosscut No. 1 was advanced 15 feet; total length, 63 feet. East crosscut No. 3, 50 feet north of No. 2, was advanced eight feet. All of these openings are in quartz that gives low assays in gold and silver.

GOULD AND CURRY.—On the 425 level from the east crosscut, a drift has been advanced 10 feet. From the end of this drift a drift running in an easterly course was last week advanced 16 feet, passing a streak of milling ore. On the 300 level short drifts are still being run in various directions. The raise in the old stope is up 54 feet, showing a little milling ore. Repairs to the south compartments of the main shaft are still in progress.

OPHIR.—On the 1065 level west crosscut No. 1, from the south drift, was extended 30 feet. South drift, No. 2, started from this east crosscut No. 1, was advanced 28 feet. The ground passed through was of a favorable character, being a mixture of vein porphyry, quartz and clay, with a preponderance of quartz. This quartz is beginning to yield assays. The new winze (No. 1) below the track floor on the 1300 level is in promising material.

BALTIMORE.—On the 300 level, the main drift is progressing well, and has about reached the edge of the vein where the upraise will be started that is to tap the old 225 level. The raise will follow the course of the vein. On the 400 level, the old drifts are being cleaned out and put in shape for prospecting. There is much new ground to explore on this level.

BEST AND BELCHER.—On the 1500 level east crosscut No. 1 was advanced 75 feet; total length, 502 feet. It has entered soft porphyry. No. 2 was advanced 85 feet; total length, 458 feet. The formation is in vein porphyry, clay, and fine lines of quartz. During the past three days the amount of quartz has somewhat increased.

CROWN POINT.—Sufficient ore is being extracted to keep the mills in operation, and in the prospecting sections some new deposits are being shown up. The Mexican mill is working about 130 tons of ore a day right along. More ore could be extracted could milling facilities be obtained. Meantime ore is being opened out and put in shape for being taken out.

BELCHER.—Are still taking out 100 tons of ore a day. This keeps the Vivian and Santiago mills fully employed. A good deal of prospecting is being done and the force of men so employed are opening up some good deposits of ore. The force of miners is being gradually increased.

HAYWOOD.—This mine keeps the Briggs and Thompson mills fully employed. Could facilities for milling be obtained, an almost unlimited amount of paying ore might be extracted. A large deposit of excellent ore has been opened up in the east drift on the 200 level.

UTAH.—During the week the north drift from the main west drift was advanced 45 feet, and is now in 550 feet. The material is a mixture of quartz, clay and porphyry. The quartz is of a fine appearance, but assays are low.

YELLOW JACKET.—About the usual daily yield of 160 tons is being obtained. This is as much as the mills can work. Nearly all this comes from the 1300 and 1400 levels. Above these levels a large amount of prospecting is being done.

OVERMAN.—About the usual amount of ore is being extracted and deposited on the dump, where it is awaiting milling facilities, as the Belcher is now using the Vivian mill, where the ore was formerly worked.

HALE AND NORCROSS.—The connection between the main south drift on the 1300 level and the old incline gives a fine circulation of air. Crosscutting will soon be commenced at this point.

JUSTICE.—The prospecting drifts on the 250 and 310 levels are making good progress, and a considerable amount of ore that will pay for milling is being saved.

CHOLLAR.—At the Sharon shaft on the croppings a considerable amount of ore is being hoisted. Prospecting will soon be in order on the 1300 level.

SCORPION.—On the 300 level the east drift was advanced 32 feet. It is still in the usual vein material. The ground continues dry.

SAVAGE.—The usual yield of ore is being obtained from the 500 and 600 levels, and the prospecting sections are looking well.

VIVIAN.—The ore-producing sections are still showing well, and a considerable amount of ore is now on the dump.

Belmont District.

CHICAGO.—Belmont Courier, April 23: The Chicago M. & R. Co. concentrators are running constantly. The mine is looking well and the work of development is pushed vigorously. The mill is undergoing some repairs. On the 16th inst. the company made another shipment of nine bars of bullion, weighing 749 pounds, and valued at \$8548.36.

Aurora District.

THE SILVER LINING.—Walker Lake Bulletin, April 20: For some time the Silver Lining mine has shown itself to be one of the most promising properties in the county, and citizens of Aurora have felt that the camp would have a renewal of lively times, through the output of ore from the mine. The past was, however, only a hint of what is now, and what will be. A long delay in work was caused by the necessity of running a tunnel for the sake of more economic working. This tunnel was run along the ledge some distance under the old workings and in its progress developed an exceedingly fine ore body of great extent. Last week connection was made between the workings and everything will soon be ready for active operations. At the end of the tunnel, the ore is of a superior quality, and a winze, which, when last heard from, was down 12 feet, was in good ore all the way. Since the tunnel

began there has been in the present time a constant improvement, and the almost unexpected addition to their available ore assets is very gratifying to the managers. There is a large quantity of good ore in the old works, and the large deposit developed by the tunnel assures many dividends.

Bernice District.

A MILL.—*Cor. Renn Gazette*, April 22: The recent sale of Mr. G. W. Bothwell's mill property at Bernice, Churchill county, has brought new life and activity to a promising mining camp, which has, for two years, been somewhat hidden in obscurity. Mr. W. W. Williams, the purchaser of the mill property, is the individual owner of the Golden Crown mine and also the North Extension claim. Mr. Williams will take possession of the mill and other property which he has purchased of Mr. Bothwell, on or about the 25th inst. The Golden Crown mine has been extensively prospected since the time at which Mr. Williams ceased milling ore, which was nearly two years ago. The mill will start under the auspices of the late purchaser, on the first of May next, and we anticipate that the sound of ten stamps will continuously break upon the ears of delighted miners and old prospectors of Bernice and vicinity, inspiring renewed energy and interest in the coming mining camp of Churchill county.

Eureka District.

ORE SHIPMENTS.—*Eureka Sentinel*, April 24: During the past week ore shipments were made from the mines of the district to the Richmond works—Dunderberg mine, 59 tons; Silver Lick, 23 tons; White Pine, 3 tons. Eureka Co.—Margueretta mine, 1 ton; Lone Pine, 1½ tons; Geddes & Bertrand, 1 ton.

Hawthorne District.

WORKING AND PROSPECTING.—*Esmeralda News*, April 23: The lack of water supply has tended to retard thorough prospecting in Hawthorne district, and whenever prospectors combated this inconvenience, their efforts have been invariably rewarded by a handsome return. This district abounds in ledges showing flattering prospects, and no doubt this summer will not pass without adding an increased supply of gold to this county. The season is now opened with promising advantages, and the miners, prospectors, and residents are already exemplifying confidence in the mines of this district by working, prospecting, and supplying the wherewith to develop them. Frequently a nice lot of ore is extracted and shipped to reduction works, netting the owners adequate compensation for their time and trouble. The district, as yet, is not prospected to any extent.

A RICH STRIKE.—T. J. Brodigan and M. Carabantes, the fortunate owners of the Benus mine, near the Pamlico, created considerable stir on the streets by the exhibition of specimens of immensely rich gold ore from their mine. The specimens presented weigh 5 or 6 pounds each, and show that the ledge must be large and rich. The discovery of this rich ore has just been made, and Thursday morning Mr. B. sent his team out with provisions and tools to more thoroughly develop their new find.

ORE TO BE CRUSHED.—The Lapanta company is going to have 100 tons of Lapanta ore worked at the Moss mill, at Kinkaid. There is plenty of ore in the district which would be milled if a mill should be erected close to the mines, which, as a matter of course, will be done in time.

Northumberland District.

SHIPPING ORE.—*Belmont Courier*, April 23: The miners engaged in the development of Northumberland district feel confident that the mines of that locality will prove rich and valuable. They are still shipping their ore to Austin for reduction.

Philadelphia District.

LEDGE-WIDENING.—*Belmont Courier*, April 23: Judging from present indications, the Laity, in East Belmont, will soon be out of the "prospect" class, and will take place among the first-class mining properties of the district. The ledge is widening as the work of sinking progresses, and the ore is the richest ever uncovered in Philadelphia district.

Reese River District.

WORK TO BE PROSECUTED.—*Virginia Chronicle*, April 22: The work of developing the mines in the Manhattan group at Austin, Lander county, will be vigorously prosecuted the current year. The Toiyabe shaft will be sunk deeper and the new ground at a greater depth prospected for the downward continuance of the vein on the upper levels. The Frost shaft in the center of the group of mines, namely, the Oregon, Paxton, Curtis and North Star, having better facilities than any other shaft for the development of the network of ledges which have in former years yielded immense quantities of rich ruby and sulphurets, will be also sunk deeper and new ground unexplored prospected. The water in the Lander shaft below the 800 level will be pumped out in a few days, and it is the intention to sink the shaft and determine whether the ledges are not as rich deeper down as they have been nearer the surface.

San Antonio District.

PROSPECTED.—*Belmont Courier*, April 23: San Antonio mining district will be beard from as soon as the railroad runs through that section. Some of the mines are being prospected under the supervision of Asa B. Eastwood.

Tybo District.

MILL.—*Belmont Courier*, April 23: It is now thought that the Tybo mill will be in readiness to start up about the 1st of June.

Union District.

CINCINNATI COMPANY.—*Belmont Courier*, April 23: Work is prosecuted vigorously in all the mines in Union district, Western Nye, owned by the Cincinnati Co. Good ore is encountered and extracted daily, and the Knickerbocker mill is kept running constantly, crushing the ores from this district. Several bars of silver bullion were shipped last week. The owners are very much encouraged by the promising condition of the mines, and they will devote considerable of their attention to their development.

ARIZONA.

MOHAVE MINES.—*Miner*, April 23: From all reports there is a prospect of the consummation of 10 or 15 big mining trades in the next three months. During the past week the sampling works have run through two carloads of ore from the C. O. D. mine, besides several smaller lots from the various mines

in the neighborhood. T. L. Ayres has made a sale of the Union mine near Cerbat for \$40,000. The Union mine is one of the largest lead deposits in the county. Mr. Cockburn tells us that the branch sampling works at Prescott are starting in under very favorable auspices; that there are about seven carloads of ore stacked up at the works, and that ore is now coming in at the rate of 10 tons per day. The mill building is about completed and the machinery will be put in place in a few days. Ed. Cook and Hugh O'Donnell, who have a lease on the Flores mine at Cerbat, have opened up a body of gold ore for 100 feet in length, that will measure from 18 inches to four feet in width, and carries from \$40 to \$500 in the free-milling gold in Wallapai district. Thomas McMahon, who has taken a lease on the old workings of the Prince George south, after two days' work, has opened up 18 inches of the rich ore for which the mine is noted. George Bowers has just struck a body of sulphurets ore in the bottom of the main tunnel on the Gibraltar mine at Layne Springs. The tunnel is in 450 feet and he has been running over this rich ore body, as is shown by the recent development.

COLORADO.

ORE.—*Elk Mountain Pilot*, April 23: The Bullion King, at Irwin, is now moving some ore to market, the roads having become passable. They have considerable ore on the dump ready for shipment, and have a large body of splendid ore in the lower level. Supt. Koppel is in Denver. Work is still progressing on the Daisy group and with favorable result. The lessees of the Excelsior mine, in Poverty gulch, who have kept pegging away all the past winter, have opened a trail to the mine, and Ross' jack train is now engaged packing ore to the breaker. It is stated that Mr. Baker, formerly of the Volunteer mine, near Pitkin, has assumed the management of the Sylvanite mine and smelting works at Gothic, and that both will be put into operation as soon as the road to that town is in a passable condition. Work will be begun by the Lloyd Bros. on their Crystal river property some time the coming week. They have some splendid property.

IDAHO.

SALES OF MINING PROPERTY.—*Idaho Statesman*, April 21: The Idaho and California pioneer, Matthew Graham, while abroad effected a large sale of Idaho mining property to an English syndicate. This indicates that Graham has made a sale of a group of mines in the Silver mountain district, about 50 miles up the Boise river. Captain Nye also informs us that V. S. Anderson, of Hailey, who is now in London, telegraphs to his wife that the sale of the Atlanta property is sure. If these reports are true, there will be active operations in Silver mountain and Atlanta mining districts, and a wagon-road or a railroad will be built up the Boise river.

QUARTZBURG.—*Idaho City World*, April 23: Wm. Spaine, from Quartzburg, reports everything jogging along in the usual way. The new Gold Hill mill keeps up a constant pounding, as did the old mill of this company. A hydraulic chief arrived the other day for Wm. Barker. It will be used in the claim in Steamboat gulch, known as the Kingsley and McDonough ground. This claim has not been worked for three or four years. Barker will begin work this week.

WOOD RIVER.—*Hailey News-Miner*, April 20: It is reported that 12 feet of high-grade ore has lately been struck in the lowest level of the Minnie Moore, at Bradford. Twenty inches of ore are reported from the Japan mine. There is good indication of a large output from the mine this summer. There is a fine streak of ore in the Rebellion mine, below Bellevue. The ore vein in the Crossus mine has been cut by the tunnel, and the vein is now open to a depth of 270 feet below the surface.

DEER CREEK.—*Hailey Inter-Idaho*, April 22: Steve James, who has charge of the Montana and Snowfly mines on Deer Creek, came down last evening. He says the ore body in the Montana holds its own for extent and richness as work is pushed on the vein, and that it is destined to become one of the leading mines on Wood river. Also, that the Snowfly is improving at every stroke of the pick.

POTOSI GULCH.—On the Elza claim and the Neill fraction at the mouth of Potosi gulch, Frank Heller and eight men are working, ground-slucing on the bar and piping in the channel. They had one large pit nearly ready to be cleaned up about 10 days ago, when the rains fell and the floods came and got in their work at that pit and in the neighborhood thereof to such an extent that Frank and his partner write—\$1000 as the result of the jamboree of the elements. The ground is good. Above the Elza con., Hall & Co. are working rich ground from which they made a large cleanup Thursday. Above them still Shuster, Range & Co. are piping on a rich bar. They have done an immense amount of work and well merit the large cleanups which it seems probable they will get. Between the bar and the Galivan, Booth Ashman claims, there is a lot of ground which is known to be very rich, having been thoroughly prospected, but with which the owners can do nothing now, the water necessary for piping being controlled by the claims above. Galivan, Booth & Ashman have three full claims on which they have done a vast amount of work. A portion of the lower one is now used for a dump for a 20-inch bedrock flume 600 feet long. Eight men are working in two shifts, sluicing.

TRAIL GULCH.—*Coeur d'Alene Record*, April 20: Near the head of Trail gulch, Bremer, Stearns, Herder and Carr, owners of the old McCauley ground, comprising the Darnell claim and the claims formerly owned by Sullivan & Co., are ground-slucing a long, narrow strip where the bedrock is about eight feet below the surface. Below the above claim 12 men are at work on the rich ground of Nickerson Bros. & Co. They are using a penstock and are washing a rich channel pay streak 40 or 50 feet wide. Sterling & Co. on the upper part of the Horse Shoe are getting good pay. Near the mouth of Placer gulch Maboney & Co. are working rich ground. They have already made one of the largest cleanups of the season. The Miller claim is still flooded. On the Black Hills several men are employed getting things in readiness to begin paying operations as soon as water can be controlled. On the Montana Bar claim on the mountain, Dan McGrath is employing six men and has already piped off more gravel than was handled

all last season. The ground is known to be rich and the claim is likely to rank this season among the best producers in the mines.

NUGGET.—*Coeur d'Alene Record*, April 20: The largest nugget ever found in the Nickerson claim was picked out Wednesday. It is somewhat egg-shaped, weighs 18 ounces and contains possibly two ounces of quartz.

MONTANA.

DEER LODGE COUNTY.—*New Northwest*, April 22: Mr. William Hyde gives the following account of observations recently made in the mining camps near the northern boundary of Deer Lodge county. The Jay Gould mine is 30 miles northwest of Helena, near the head of Gould gulch, whence it takes its name, and is about 7000 feet above sea level. It was purchased last fall by Helena parties for \$75,000, and has been developed by a 350-foot shaft, and 600-foot drift run along the 350-foot level east and west. The lead shows a face at each end six feet wide of free-milling gold and silver ore, the metals being equally divided. A 900-foot tunnel is being run to tap the lead at the bottom of the shaft. It is now in half-way. A steam drill is used for boring it. A new 10-stamp mill was put up during the winter at the mouth of the tunnel, and from two cleanups made in February and March, they realized \$17,000 and \$19,000 respectively, besides some concentrates not included. The mill is from Frazer & Chalmers, with a Corliss engine sufficiently powerful to run 30 stamps, it being the intention to add additional stamps during the summer. There are two true vanners. About 80 men are employed. About half a mile below the Jay Gould mine, and on the south or opposite side of the gulch, B. Ackroy & Co. have struck a bonanza in a six-foot gold lead that prospects \$40 per ton, which they have named the Grabill. At Stemple, 12 men have taken out about 250 tons of gold ore from the Homestake lead, which is only from 6 to 12 inches wide. At Seven-up-Pete, on the west side of the main range, seven men wintered, developing quartz leads that are very promising, and 15 locations were made. The Silver Bell lead, on Poor Man, is being developed, and its extensions, called the Stewart, Comet and Humbug, show a vein of rich silver ore, seven feet four inches wide.

THE BUCKSKIN CO. will open their ground this season, which is distant but a few miles south of the Sheep Mountain country.

PROSPECTS.—*Anaconda Review*, April 22: The last week has been unfavorable to mining operations in this vicinity. The great trouble in the district just west of Anaconda is the snow which still lies very deep but a short distance up the valley. As the mines in the district are all in a very early stage of development and owned principally by men of very little capital, this difficulty is much more serious than it would be in an older camp. The big drifts are disappearing, however, and prospectors are beginning to venture out again. The Ontario mine is located on the eastern slope of Warm Spring Creek canyon, about 2½ miles from the Anaconda and Phillipsburg stage road. Reliable information says that this mine will be bonded within 10 days for \$10,000. The present owners are T. C. Davidson, C. E. Sawtelle and C. B. Caspar. The adjoining claim on the north is the Dead Fir, owned by George Kendall and Lee Rice. The Red Oxide has shipped three carloads of fluxing ore to the Butte Reduction Works. The owners are C. E. Sawtelle, C. E. Keenan, William Sharp and J. F. Todd. The class of ore found in this mine is copper carbonate, black and red oxide. The claim is situated about half a mile west of Oleson gulch on the Warm Spring creek slope. The Bung-Your-Eye gold claim, owned by George Gunn and William Seebree, is showing up a very good body of pay ore, sampling \$23 across the ledge. The Little Lester, owned by Church & Young, is looking well. The boys reached the 100-foot level yesterday and have begun drifting. They are taking out considerable pay ore. The next strike to be mentioned is the Flora Blanche, located by Malcolm McCav, which lies northeast of Sinclair's sawmill. This lead assays 28 ounces of silver and 22 per cent lead from the outcrop. A number of prospectors are expecting to move to the Lost Creek district at an early day.

AROUND VIRGINIA CITY.—*Cor. Butte Inter-Mountain*, April 15: Mining matters hereabouts have taken a tumble. Why this should be is beyond my understanding. Evidence undisputed is upon everybody's tongue that we have developed immense bodies of very rich ore but no one seems to want it. It is gold-bearing and there are thousands of tons of it in sight that runs all the way from \$24,000 to \$15 a ton. The lowest assays that I have ever heard of have not fallen below the last-named figure. Of course the high-grade ore above mentioned is somewhat scarce and expensive to work.

THE FLATHEAD COUNTRY.—*Butte Miner*, April 14: The gold excitement on Wolf creek, about 20 miles above the valley, will undoubtedly attract many to the place this year. Mr. Nelson saw some pretty good rock coming from different places adjacent to the valley, and thinks there is no doubt it contains some fine mineral. One party took out \$2000 of gold last fall, and they will resume operations when the snow disappears sufficiently for them to get in.

BUTTE NOTES.—*Inter-Mountain*, April 21: The Allie Brown is still producing very rich ore. The Josephine is producing a large quantity of ore. At the Cora, sinking has begun from the 250 to the 300-foot level. It is reported that Jacoby & Emigh, the lessees of the east extension of the Josephine, have struck it rich. Salt is being shipped to the Margat Ann mill and everything is being put in shape for the resumption of work next Monday.

NEW MEXICO.

LIXIVIATION.—*Black Range*, April 23: The test of 200 tons of Black range ores by the lixiviation process will begin at the mill about May 1st. This test is looked up to with no little interest by those who are interested in mines in northern Sierra county, as the immediate revival and growth of our mining industry depend upon the success of our lixiviation works, which, however, have every evidence of being faithful to the purpose for which they were intended.

BORNITE ORE has been discovered in the King

mine adjoining the Homestake near Hermosa. This discovery of bornite is the first in the Palomas mining district. The owners of the King, Messrs. Wulford, Davison & Dalglish, are pushing development work on this property and are now down over 30 feet and have an excellent showing of ore. The King promises to develop into value as great as the Homestake, as every foot of work done adds to its appearance and worth. Mining was never more active than at present in this district, every one feeling confident that a bright and prosperous future is immediately in store for us. This district (Apache) with her plentiful showing of mineral confined within true fissure veins, when once developed will astonish the world.

OREGON.

PLACER AND QUARTZ.—*Jacksonville Times*, April 22: Arnett Bros. have struck very rich diggings on Briggs creek, Josephine county. The recent rains have done much to keep up the water supply, which was failing fast. Cornelius & Co.'s quartz-mill started up not long since, but the pump broke this week, causing more delay. The gulch in Galice Creek mining district which Ennis & Cameron have rented to Chinese is turning out very rich. We learn that some very rich pockets of gold-bearing quartz have been found in McDonough & Kahler's ledge near Fort Lane. A test of some ore from the Green Mountain ledge was made recently, and the result proved highly satisfactory. E. K. Anderson is making a big run at the '49 diggings in Eden precinct. There has been a large supply of water and prospects are good. A correspondent of the *Times* writes that most of the miners of Evans and Pleasant creeks are cleaning up. They had a good run and have done pretty well. Wm. Bleckert, of Gall's creek, is doing well this season. He lately picked up some handsome pieces of gold, one of which weighed \$7 and the other \$14. H. C. Martin, of Galesville, has taken another contract of delivering ten tons of quartz from the Green Mountain ledge at the depot at Glendale, which will be shipped to East Portland for reduction at once. The Jacksonville Milling and Mining Co. held a meeting last Monday evening, and concluded to continue prospecting their claims on Timber gulch. There is much activity in Grave Creek mining district, Josephine county, where some quartz ledges are being prospected by the St. Peter's Mining Co., for which E. S. Smith is expert. The results so far have been quite promising. It is said that the company that has been prospecting Green Bros.' ledge in Galice Creek district intends resuming work in the near future. Another tunnel will be run, as the ledge was not reached by that dug last year.

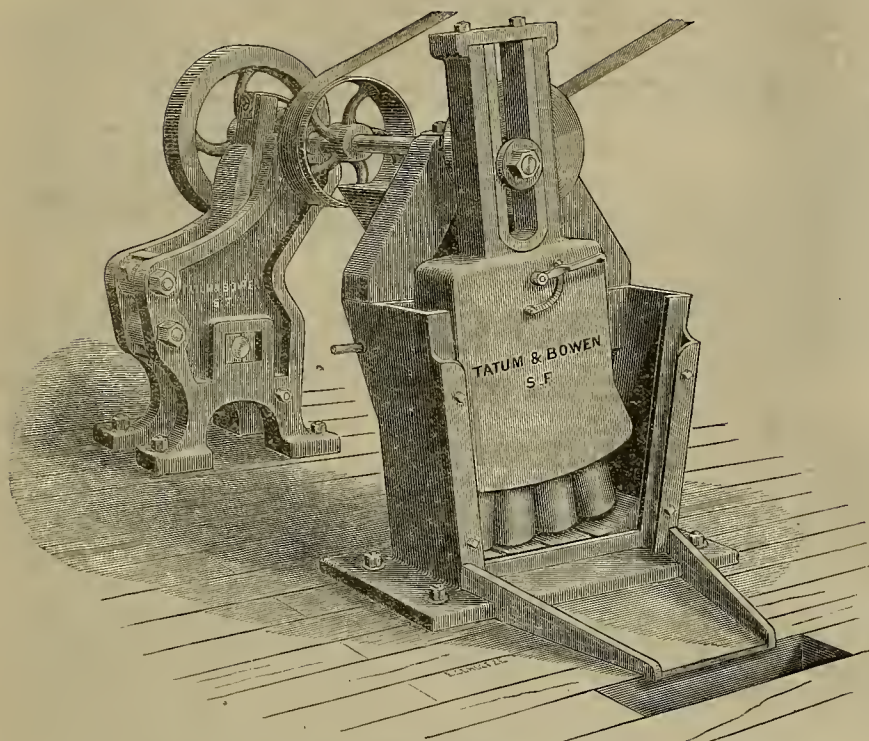
SILVER CREEK.—*Cor. Bedrock Democrat*, April 23: Located just over the mountain, about 25 miles westward from Baker City, and in a broad and beautiful forest-covered cove, surrounded by lofty, precipitous peaks of the Blue mountain range, is the young and promising gold and silver quartz mining camp of Silver creek. Situated as it is, convenient to the railroad over an almost level wagon road, with all the facilities combined and near at hand for mining and the reduction of its ore, and in the very heart of a civilized and enterprising community, lying dormant and unnoticed as it has been in the past, is something that astonishes the old quartz miners who are being attracted here from other regions of the mining world. A more regular and unbroken system of true fissure veins never existed in old Mother Earth than can be seen along the course of this broad and extensive mineral belt. One of these many veins which find their way across the cove is enough in itself to support a large and thriving camp of a few thousand population. For five miles along its course it shows an outcrop of from 20 to 200 feet in width, with numerous seams of high-grade ore, some of them two feet wide—which occasionally unite and form large ore bodies—and so continue along the whole distance of the lode as far as it has been discovered. Another parallel vein but a few hundred feet from the above, and known as the California, is sufficiently developed to produce at the least 100 tons of ore daily, which will average about \$50 per ton. A sorted lot of this ore shipped to San Francisco, yielded \$350 per ton. This, and three other similar mines adjoining each other, have just been bonded for the small sum of \$57,000.

UTAH.

REVIEW.—*Salt Lake Tribune*, April 22: The receipts in this city for the week ending the 20th inst., inclusive, were \$95,643.07, of which \$46,381.46 was bullion and \$49,261.61 was ore. For the previous week the receipts were \$81,697.52 in bullion and \$53,780.11 in ore, a total of \$135,477.64. The Ontario output for the week was 41 bars of bullion, 26,076.17 fine ounces; no shipments of ore. The Daly product during the week was 13 bars of bullion, 18,110.83 fine ounces; no sales of ore. The fine bar receipts of the week were to the value of \$20,966.45; dore bars, \$4000. The Hanauer smelter produced for the week, bullion to the value of \$17,915.

PARK NOTES.—*Record*, April 23: Last Sunday the Mackintosh sampler started to work on Ontario ore with the new sampling machine, which Mr. Mackintosh bought in Denver, with the patent right. It works like a charm and is the best thing yet for accurately sampling ore. Ross-camp & Glenn, the veteran prospectors, report a valuable strike in their group, northwest of the Crescent. The vein encountered averages two feet in width, and assays from it go about 80 ounces silver. The new rate on ore from Park City to Kansas City is \$11 per ton; to Omaha and Council Bluffs, \$10; Denver, \$7; and to Ogden or Salt Lake City, \$4 per ton in carload lots. More unjust discrimination this is. The Crescent tramway is being cleared, cars repaired, and other preparations to resume ore hauling within a short time.

ORE AND BULLION SHIPMENTS.—The Mackintosh sampler received during the week 439,700 pounds of Ontario ore. The Daly will ship ore again very soon. During the week the Crescent shipped 212,000 pounds of concentrates, but no first-class ore. On the 17th inst, the Ontario shipped 41 bars of bullion, containing 23,468 fine ounces of silver. The Marsac mill shipped last Sunday six Daly bars, of 6760 fine ounces. On the 21st, Thursday, the product was six bars, containing 7255 fine silver ounces, and to-morrow or Monday another average shipment of Daly silver bullion will be made.



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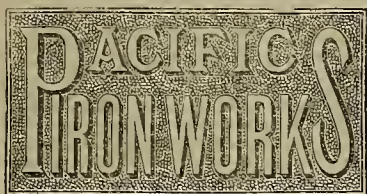
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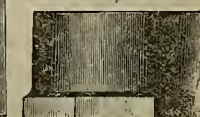
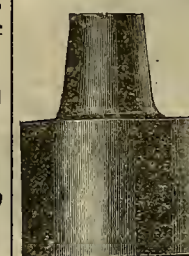
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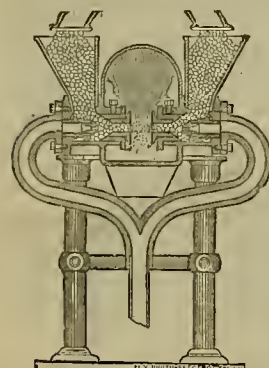
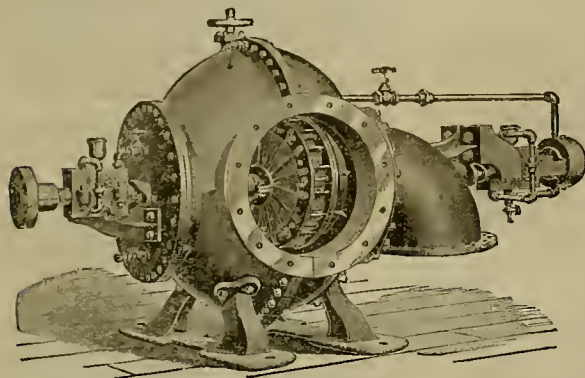
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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 252 Market St., S. F.

- FOR WEEK ENDING APRIL 19, 1887.
- 361,390.—RIVET—M. Arnold, S. F.
361,358.—NUTRITIVE TONIC—Wm. Henley, Alameda, Cal.
361,360.—WOVEN FABRIC—R. H. H. Hunt, S. F.
361,532.—MITER-BEVEL—L. H. Lewis, San Jose, Cal.
361,367.—TREATING NIGHT-SOIL—R. W. E. Mac Ivor, Sydney, New South Wales.
361,473.—LASTING MACHINE—S. N. Washburn, Union, Oregon.
361,663.—ELECTRIC ARC LAMP—G. A. Wiese, S. F.
361,341.—VELOCIPEDE MOTOR—J. Witt, Los Angeles, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court Department 10, San Francisco:

SEGREGATED WASHOE M. Co. April 27. Location, Nev. Capital stock, \$10,000,000. Directors—M. L. Reynolds, W. G. Edwards, P. S. Dorney, J. H. Maboney, Theodore C. Metzler.

SOUTHERN CALIFORNIA COAL AND CLAY Co. April 25. Object, to engage in mining and selling coal and clay, and to engage in the manufacture of terra-cotta pipe brick and other articles. Capital stock, \$100,000. Directors—John D. Huff, John Dolbeer, George D. Gray, William J. Mcgean, E. L. Allen.

MIDDLE FORK M. Co. April 27. Location, California. Capital stock, \$1,000,000. Directors—George C. Perkins, Thomas Price, Arthur F. Price, F. W. Sumner, R. H. Lloyd.

PERFECT COMBUSTION Co. April 27. Principal place of business, Oakland, Alameda Co. Object, to own, buy, and sell United States and foreign letters patent for all kinds of inventions for saving fuel and smoke burning; to grant or license others under any such patents, the right to make, use, or sell the same; also to manufacture, use and sell throughout the United States or elsewhere; to own, buy and sell real estate; to mine, merchandise or do a transportation business, or any other act or acts necessary to carry out the foregoing. Capital stock, \$100,000 in 10,000 shares. Directors—John H. Hobart, T. J. Pearce, J. G. Pearce, H. Laperle and D. D. Cook.

Mining Share Market.

Some little improvement was shown in the mining share market during the week. Up on the Comstock, matters are looking more lively. The new water-mills will help that section out largely. There is a rumor here that J. C. Flood has disposed of his Comstock interests, but it has not been confirmed.

In the Potosi and Chollar are large quantities of ore that are awaiting milling facilities. Once this ore is hoisted out and sent to the mill, there will be a demand for additional forces of miners.

At the Consolidated California and Virginia mines, carbonic acid gas is still being injected at the rate of 40,000 cubic feet a day, and it is believed with effect. The best evidence there is that the gas is going to where it is most wanted is that it is not coming out at the Consolidated Virginia, where the gas, which is the product of the combustion going on among the old timbers, is escaping.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Bluebird, April 20, \$17,474; Chicago, 20, \$8548; Lexington, 22, \$31,824; Alice, 22, \$27,728; Moulton, 22, \$12,640; Bluebird, 22, \$35,648; Manhattan, 20, \$13,008; Con. California & Virginia, 20, \$9,599; Bluebird, 19, \$19,308; Hanauer, 20, \$1580; Bannock, 20, \$3500; Hanauer, 21, \$1580; Bannock, 22, \$1700; Hanauer, 22, \$2250; 23, \$6573; Crescent, 24, \$3350; Bannock, 24, \$1800; Hanauer, 24, \$4750. Last week's outward mineral shipments from Salt Lake were: 21 cars bullion, \$28,206 pounds; 101 cars silver and lead ores, 2,979,780 pounds; 16 cars copper ore, 439,100 pounds; total, 138 cars, 3,947,086 pounds.

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THE Butte Record says: Louis Glass, for many years superintendent of the big hydraulic mine at Cherokee, but not now connected with it, has, it is said, been engaged to take charge of an extensive enterprise on the Island of Borneo, and will next fall go there to take up his abode.

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COMPANY.		LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Almont M. Co.	.....	Arizona.	13.	05. Mar 30. May 7.	T. Hartman.	330 Pine St.
Baker Divide M. Co.	.....	California.	13.	25. Mar 19. Apr 19.	J. D. M. Kent.	330 Pine St.
Best & Belcher M. Co.	.....	Nevada.	36.	25. Mar 5. Apr 15.	W. L. Usborn.	309 Montgomery St.
Bodie Tunnel M. Co.	.....	California.	14.	25. Mar 2. Apr 27.	M. O. C. Harvey.	309 California St.
Comstock M. Co.	.....	Nevada.	3.	25. Mar 14. Apr 18.	A. E. Ball.	309 California St.
Con Washoe M. Co.	.....	Nevada.	2.	10. Mar 24. Apr 28.	P. MacEwen.	314 Montgomery St.
Confidence S. M. Co.	.....	Nevada.	14.	25. Apr 7. May 12.	A. S. Groth.	414 California St.
Europa M. Co.	.....	Nevada.	1.	25. Apr 5. May 12.	J. J. Moritz.	328 Montgomery St.
Florida M. Co.	.....	California.	1.	25. Mar 16. Apr 18.	J. T. Mitchell.	Grass Valley
Gould & Curry S. M. Co.	.....	Nevada.	55.	25. Mar 8. Apr 11.	G. L. Durbin.	309 Montgomery St.
Hale & Norcross M. Co.	.....	Nevada.	33.	50. Mar 9. Apr 14.	J. F. Lightner.	339 Montgomery St.
Inyo Marble Co.	.....	California.	1.	01. Mar 15. May 2.	O. F. von Rhein.	524 California St.
Julia Con M. Co.	.....	Nevada.	22.	15. Apr 18. May 24.	J. B. Stetfield.	419 California St.
Livermore Oil Co.	.....	California.	1.	65. Mar 8. Apr 12.	M. J. Deane.	310 Pine St.
Mayflower G. C. M. Co.	.....	California.	25.	25. Mar 23. Apr 25.	M. J. Moritz.	328 Montgomery St.
Manhattan M. Co.	.....	Nevada.	5.	1.00. Mar 23. Apr 25.	J. Crockett.	327 Pine St.
Mountain Tunnel M. Co.	.....	California.	4.	05. Mar 31. May 5.	J. G. Sessions.	309 Montgomery St.
Nevado M. Co.	.....	Nevada.	17.	05. Apr 14. May 23.	A. B. Paul Jr.	328 Montgomery St.
Nevada Queen M. Co.	.....	Nevada.	2.	50. Mar 10. Apr 14.	H. Deas.	309 Montgomery St.
North Belle Isle M. Co.	.....	Nevada.	12.	50. Mar 14. Apr 19.	M. J. W. Pew.	310 Pine St.
Potosi M. Co.	.....	Nevada.	27.	30. Mar 9. Apr 14.	A. C. B. Elliot.	309 Montgomery St.
Phil Sheridan M. Co.	.....	Nevada.	1.	10. Apr 15. May 25.	J. J. Scoville.	309 Montgomery St.
Richelieu M. Co.	.....	Nevada.	1.	12. Mar 18. Apr 23.	M. J. W. Pew.	4th and Townsend Sts.
Savage M. Co.	.....	Nevada.	67.	50. Mar 10. Apr 12.	E. B. Holmes.	309 Montgomery St.
Sierra Nevada S. M. Co.	.....	Nevada.	38.	25. Apr 13. May 15.	E. B. S. Parker.	39 Montgomery St.
Union Con M. Co.	.....	Nevada.	35.	25. Mar 31. May 6.	M. B. Dunnington.	509 California St.
Utah Con M. Co.	.....	Nevada.	1.	20. Apr 6. May 9.	M. A. H. Fish.	309 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Con Amador Volcanic Hyd G M Co.	Cal.	M. Casey.	16 Montgomery Ave.	Annual.....May 4
Justice M. Co.	Nevada.	R. E. Kelley.	419 California St.	Annual.....May 2
La Grange P. & Hyd M Co.	California.	A. Halsey.	328 Montgomery St.	Annual.....May 2
Morgan M. Co.	Nevada.	G. S. Neal.	230 Montgomery St.	Annual.....May 2
Russell Reduction & M Co.	California.	J. Moritz.	328 Montgomery St.	Annual.....Apr 30
Scorpion S. M. Co.	Nevada.	G. R. Spayne.	310 Pine St.	Annual.....May 9
South Prairie Coal Co.	Oregon.	T. H. Henderson.	24 Sacramento St.	Annual.....Apr 30

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50.....Apr 7
Original Hidden Treasure.	Nevada.	D. A. Jennings.	401 California St.	13.....Apr 13
Plymouth Con M Co.	California.	.....	New York.	25.....Apr 4
Pacific Borax, Salt & Soda Co.	California.	A. H. Clough.	328 Montgomery St.	10.....Apr 15
Paradise Valley M. Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	10.....Apr 15
Silver King M. Co.	Arizona.	J. Nash.	328 Montgomery St.	25.....Apr 15

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING	WEEK ENDING	WEEK ENDING	WEEK ENDING
	Apr. 7.	Apr. 14.	Apr. 21.	Apr. 28.
Alpha.....	1.35	2.25	3.75	4.00
Alta.....	2.25	2.30	2.40	2.20
Andes.....	1.00	.95	1.30	1.40
Argenta.....	.15	.10	.15	.20
Belcher.....	2.80	3.25	3.25	3.10
Brophy.....	.....	.....	.....	.....
Best & Belcher.....	5.25	6.50	6.60	6.80
Bullion.....	1.15	2.01	2.35	2.50
Baltimore.....	.70	.95	.90	.85
Belle Isle.....	.60	.60	.70	.65
Bodie Con.....	2.25	2.15	2.20	2.10
Benton.....	.70	.60	.70	.85
Bodie Tunnel.....	1.20	1.25	1.10	1.15
Bulwer.....	1.30	1.35	1.25	1.30
Con. Va. & Cal.....	1.35	1.35	1.15	1.15
Challenge.....	2.15	2.25	2.00	2.00
Champion.....	.....	.....	.....	.....
Chollar.....	5.75	6.50	6.75	6.80
Confidence.....	9.00	9.25	7.00	8.00
Con. Imperial.....	1.90	2.00	2.00	2.25
Calendula.....	.35	.45	.40	.55
Con. Pacific.....	.....	.....	.....	.....
Crown Point.....	3.70	4.25	3.85	4.25
Crocker.....	.80	.90	1.00	.85
Central.....	.65	.70	.70	.65
Dudley.....	.....	.....	.....	.....
East B. & L.....	.....	.....	.....	.....
Eureka Con.....	.....	.....	.....	.....
Exchequer.....	1.30	1.40	1.10	1.60
Grand Prize.....	.....	.....	.....	.....
Gould & Curry.....	1.15	1.25	1.25	1.00
Hale & Norcross.....	8.40	3.70	3.25	5.00
Holmes.....	.....	.....	.....	.....
Independence.....	.....	.....	.....	.....
Iowa.....	.....	.....	.....	.....
Julia.....	1.25	1.50	1.00	1.30
Justice.....	.....	.....	.....	.....
Kentuck.....	.....	.....	.....	.....
Lady Wash.....	.45	.50	.40	.55
Martin White.....	.....	.....	.....	.....
Monaco.....	.....	.....	.....	.....
Mexican.....	3.65	4.20	3.45	4.40
Mt. Diablo.....	4.10	4.00	3.75	4.00
Northern Belle.....	.30	1.10	.90	1.15
Nevado.....	63	7.00	6.25	7.00
Nevada Queen.....	2.25	2.30	1.90	2.60
North G. & C.....	.....	.....	.....	.....
Occidental.....	.....	.....	.....	.....
Older.....	.....	.....	.....	.....
Overman.....	1.40	1.50	1.35	1.45
Potosi.....	6.50	7.50	6.80	7.75
Peerless.....	.55	.70	.55	.70
Peet.....	.....	.....	.....	.....
P. Sheridan.....	.05	.05	.05	.05
Pilver Star.....	.....	.....	.....	.....
Sage.....	5.00	5.50	4.40	5.75
Sav. Belcher.....	.....	.....	.....	.....
Sierra Nevada.....	2.60	2.50	2.40	2.40
Silver Hill.....	.30	.35	.30	.35
Silver King.....	.....	.....	.....	.....
Scorpion.....	.....	.....	.....	.....
Syndicate.....	.....	.....	.....	.....
Union Con.....	2.75	3.00	2.40	3.10
Utah.....	1.00	1.25	1.00	1.30
Yellow Jacket.....	4.05	4.50	4.00	4.50

Sales at San Francisco Stock Exchange.

THURSDAY Apr. 28, 1887.	290 Exchequer.....	1.65
420 Alta.....	2.50	3.50
650 Andes.....	1.55	1.60
100 Atlantic.....	.....	1.30
100 Belcher.....	.....	1.30
200 Argenta.....	.....	1.30
150 Alpha.....	.....	1.30
120 B. & Belcher.....	.....	1.30
250 Bullion.....	.....	1.30
450 Benton.....	.....	1.30
150 Belcher.....	.....	1.30
250 Baltimore.....	.....	1.30
100 Belle Isle.....	.....	1.30
100 Bulwer.....	.....	1.30
350 Bodie Con.....	.....	1.30
200 Chollar.....	.....	1.30
350 Con. Va. & Cal.....	.....	1.30
200 Crown Point.....	1.30
250 Crocker.....	1.30
200 Central.....	1.30
100 Calendula.....	1.30
100 Confidence.....	1.30

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J. L. DOYLE—Mariposa Co.
W. J. FREEMAN—Yolo Co.
CHAS. LIST—Alameda Co.
T. C. STARR—San Bernardino Co.
S. J. LITTLEFIELD—San Diego Co.

New York Metal Market.

Telegraphic advices dated April 28th give the following New York prices:

BAR SILVER—96 1/2 per oz.
BORAX—\$4.00 cwt.
COPPER LARS—\$10.40.
IRON—No. 1, \$22.00.
LEAD—\$4.30 @ 4.35.
QUICKSILVER—53 @ 54c.

The following is the latest by mail from the "New York Metal Exchange Market Report":
COPPER—Dull, spot closing at \$10.40 @—, Transferable Notices (Lake) issued at \$10.30 @—, Transferable Notices (Chili Bars) issued at \$10.35 @—.

LEAD—Active at \$4.27 1/2 @ 4.35 spot. Transferable Notices issued at \$4.27 1/2.

TIN—Quiet at \$22.40 @ 22.50. Transferable notices issued at \$22.50.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, \$22.60 @ 22.75; Billiton Tin, \$23.10 @ 23.40; Banca Tin, \$23.15 @ 23.50; Baltimore Copper, \$9.25 @ 9.40; Orford Copper, \$9.25 @ 9.40; P. S. C. Copper, \$10.00 @ 10.25; Foreign Lead, \$4.75 @ 4.80; Foreign Spelter, \$4.70 @ 4.75.

MARBLE PRICES—At tidewater, 100-ton lots of listed items (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$21.00 @ 21.50; No. 2, \$20.00 @ 21.00; Grey Forge, \$17.50 @ 18.00; Hudson River, Grade No. 1, \$21.00 @ 21.50; No. 2, \$20.00 @ 21.00; Grey Forge, \$17.50 @ 18.00; Southern, Grade No. 1, \$21.50 @ 22.00; No. 2, \$21.00 @ 21.50; Grey Forge, \$17.50 @ 18.00.

San Francisco Metal Market.

[WHOLESALE.]		THURSDAY, April 28, 1887.
ANTIMONY—French Star.....	9 1/2 @	—
BORAX—San Bernardino.....	7 1/2 @	8
Amalgams.....	—	5
IRON—Glengarnock ton.....	—	27
Belgion—Adm.....	—	25
American Sort, No. 1, ton.....	—	23
Oregon Pig, ton.....	21	00 @ 23
Clippard Pig, Nos. 1 & 4.....	22	00 @ 23
Clay Lane White.....	22	50 @
Shot, No. 1.....	23	00 @
COPPER—		
Bolt.....	20	00 @
Sheeting.....	18	00 @
Ingot.....	19	00 @
Flask, old.....	12	00 @
LEAD—Pig.....	4 7/8 @	5 00
Bar.....	5	00 @ 5 50
Sheet.....	8	00 @
Shot, diseng. 1 1/2 @ 100 bag.....	1	65 @
Suck, 3 bag.....	1	85 @
Chilled, do.....	2	05 @
QUICKSILVER—By the flask.....	40	00 @
Flasks, new.....	1	05 @
Flask, old.....	14	00 @
STEEL—English.....	14	00 @
Black Diamond, ordinary sizes.....	10	00 @
Flows.....	4	00 @
Machinery.....	5	00 @
Sand, 40 mesh.....	10	00 @
ZINC—German.....	8	00 @
Best, 7 1/2 ft, 7 to 10 lb. less the cask.....	6	00 @
TINPLATE—Coke.....	4	90 @ 4 95
Charcoal.....	6	25 @

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DIVIDEND NOTICE.

OFFICE OF THE

Paradise Valley Mining Company.

At a meeting of the Board of Directors of the above-named Company, held April 13, 1887, Dividend No. 11, of Ten (10) Cents per share, was declared, payable on Friday, the 15th day of April, 1887, at the office of the Company, 328 Montgomery Street, San Francisco, Cal.

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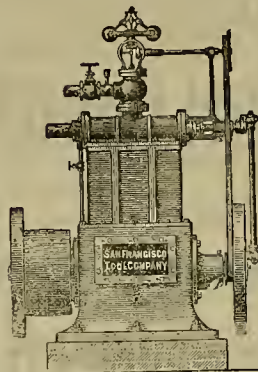
TESTIMONIAL.

OFFICE OF THE EUREKA ELECTRIC LIGHT CO.,
EUREKA, CAL., Feb. 15, 1887.

San Francisco Tool Co., San Francisco, Cal.—GENTLEMEN: In answer to yours of Feb. 8, 1887, would say: The four engines purchased from your Company in January, 1886, have been running continuously ever since, from 12 to 16 hours each day, not excepting Sundays, and have never given any trouble; and, furthermore, they have never cost us anything for repairs. I consider them fully as economical as our slide-valve engines, which we are using. One of them is a balanced valve, Haekins' make, and the other is the New York Safety Power Company's make. The relation to the cost of keeping your Single-Acting Engine in repair to the cost of keeping the Slide-Valve Engines which we purchased the same month we purchased your engines, and working under the same conditions, is, that while there has been no expense in either material or labor on the engines furnished by your Company, the expense of keeping the Slide Valve Engines in good running order has cost, on an average, \$8 to \$12 per month for each engine.

A portion of the time the Single-Acting Engines have been run by the fireman, and I can recommend your engines to parties that are not close to a machine shop, and do not want to keep an engineer and fireman, as with your engine all the attention they require is to fill the oil cups once every 16 hours, and turn the steam on and shut it off. The balance of the time the engine takes care of itself. Yours truly,

A. A. OSBORN, Superintendent.



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SILVER-PLATED AMALGAMATING PLATES
FOR SAVING GOLD

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QUARTZ AND PLACER MINING.

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OVER 3000 ORDERS FILLED!

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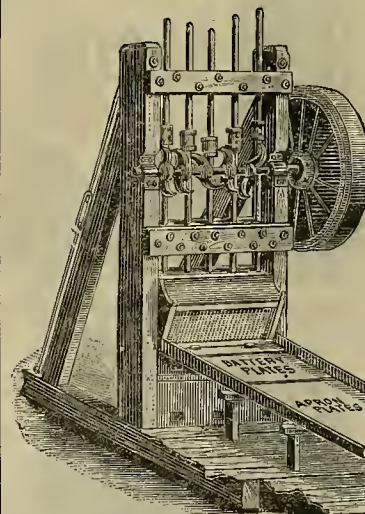
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A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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Gauge, 20 inches; height, 5 feet 6 inches; width, 4 feet; weight (fully watered and coal), 8 tons. Also one extra set wheels, tools, 30-pound iron rails, etc.

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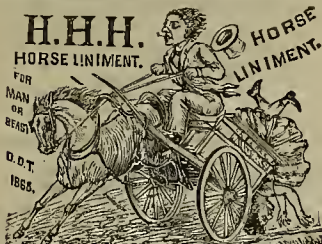
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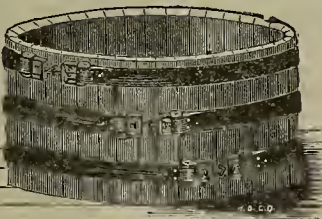


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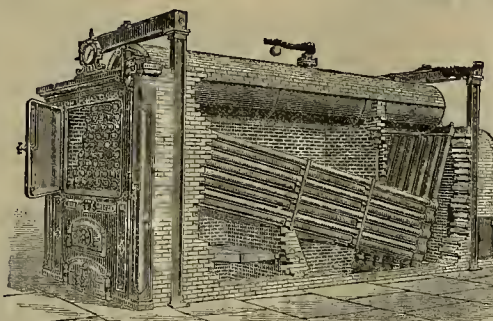
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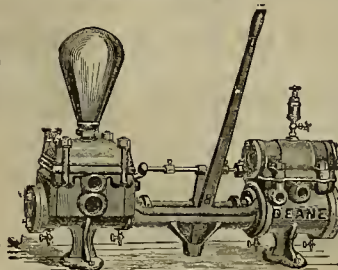
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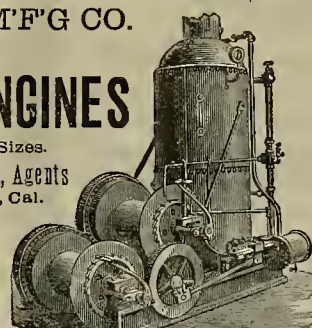
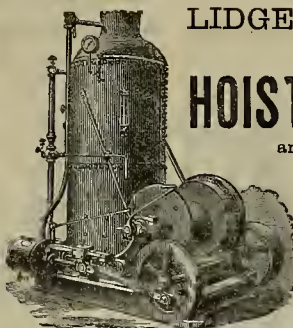
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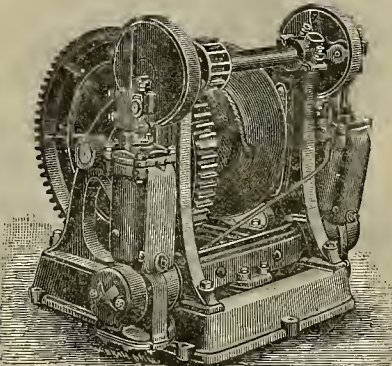
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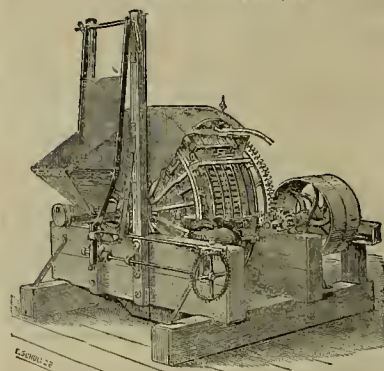
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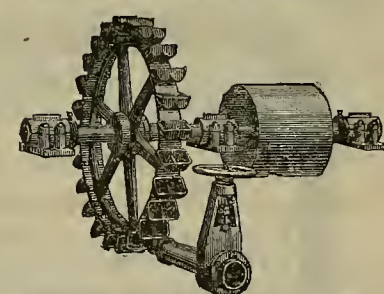
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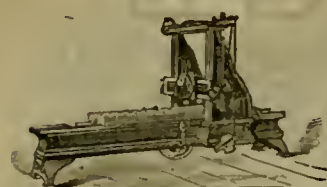
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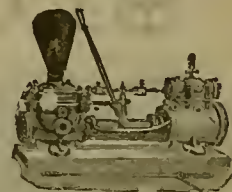
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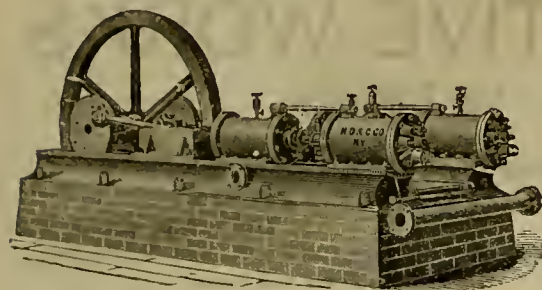
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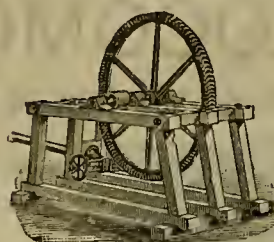
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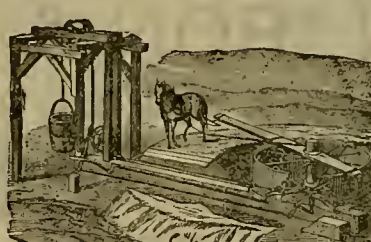


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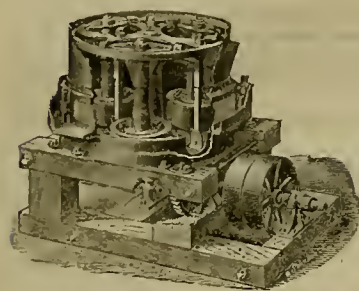
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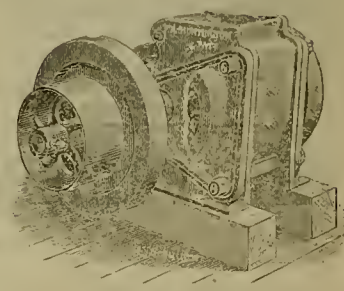
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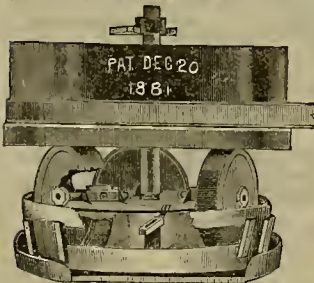
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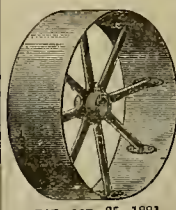
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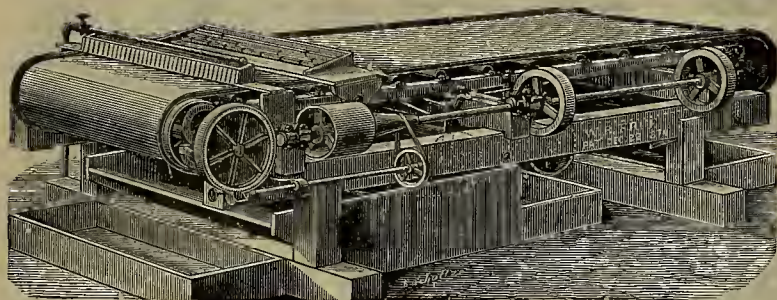
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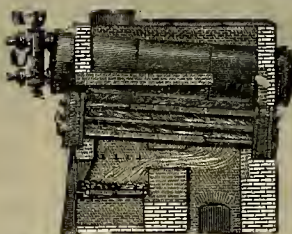
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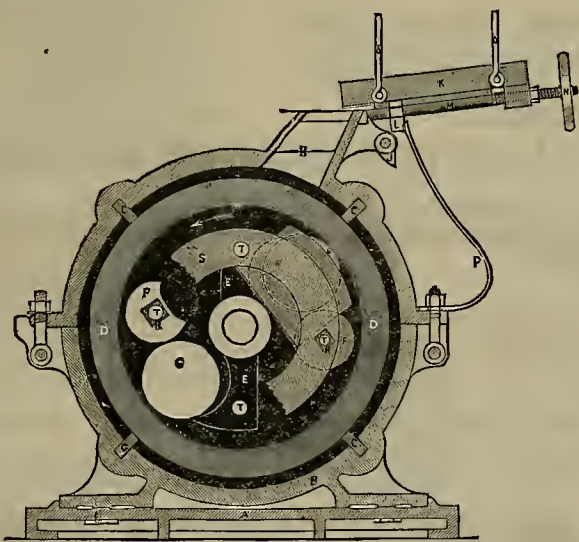
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Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.

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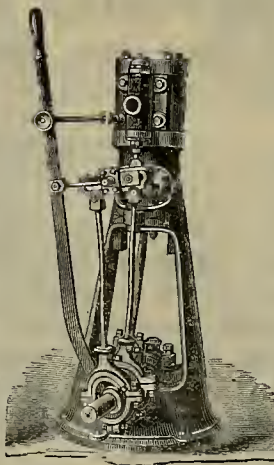
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
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New Metallurgical Apparatus.

Joshua E. Clayton and Simon F. Mackie, of Salt Lake, Utah, have recently invented some improvements in metallurgical apparatus, consisting of a roasting or heating furnace of suitable construction, with a containing vessel or chamber supplied with suitable tuyeres, for the purpose of introducing into the contained mass of material, air, steam, or other gas or vapors, at such pressure as will suffice to enable them to boil or be blown through said mass.

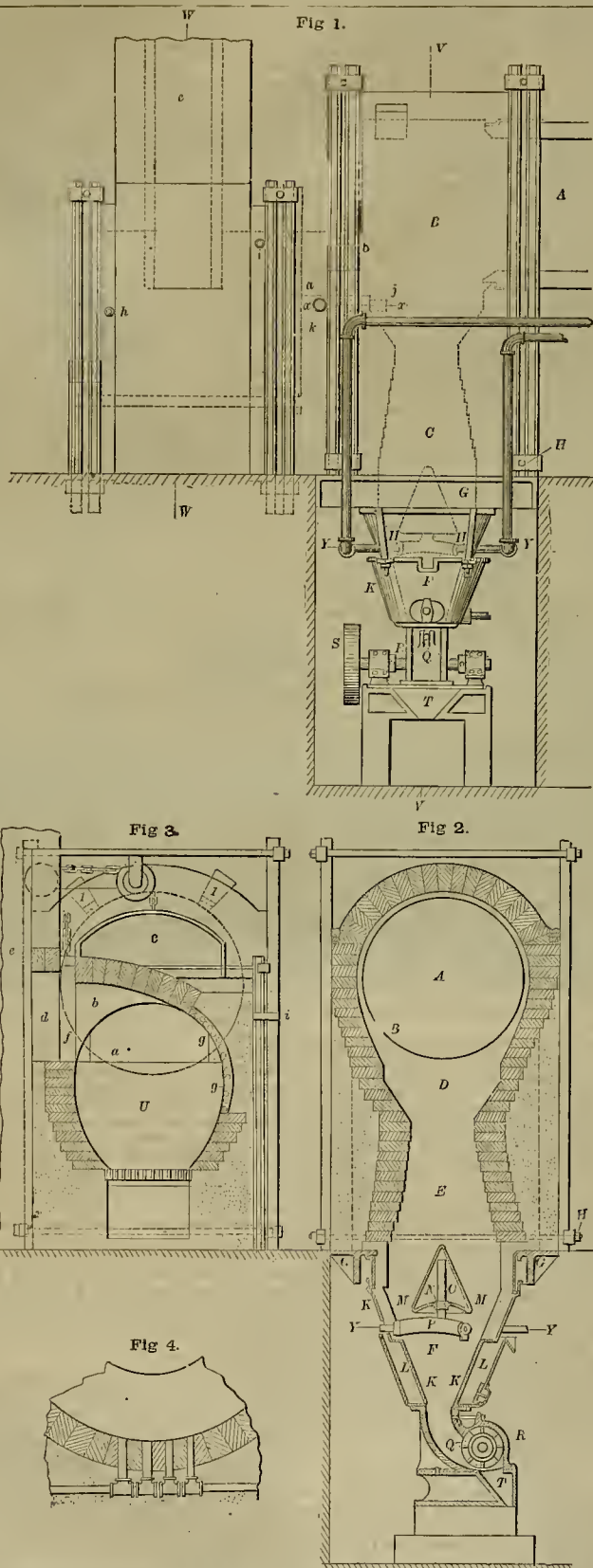
The mechanism designed by the inventors we give in the accompanying engravings, but it is manifest that numerous modifications are possible. In the engravings Fig. 1 is a side view; Fig. 2 is a transverse section on the line VV, Fig. 1; Fig. 3 is a transverse section on the line WW, Fig. 1; Fig. 4 is a partial horizontal section on the line XX, Fig. 1.

A is the fire-hox end or mouth of an ordinary rotating or other furnace, which discharges into a chamber, B, covering the hopper or receiving-chamber C. This hopper C is formed of three truncated conical portions. One inverted truncated cone, D, catches the roast as it comes from the mouth A of the rotator and delivers it into the truncated conical portion E, whence it passes into the lower vortical truncated portion, F. As figured, the conical portions D and E are of brickwork, and are built upon a deck-plate, G, covering a well or hole. In the well or hole is hung (by four T-bolts, H, taking into lugs I in the deck-plate G) the casing K, whose upper part is lined with fire-clay or other suitable material, while the lower part is shaped so as to form a water-jacket, L.

In the receiving-chamber C are introduced tuyeres for allowing air, gas, or vapor to be blown into the mass in the hopper. These tuyeres M (16 in number) are figured as holes radiating from the lower portion of the cone N, which is supplied with air, etc., by the pipe O, which connects with the three radial pipes P, resting upon the casting K. These pipes P are connected with suitable air-pipes, stop-valves, etc., which, to avoid complication, are only partially indicated in the drawings. The lower portion of the casting K rests upon the box of the discharge-wheel Q, which is keyed on the axle R, this being furnished with a pulley, S, for regulating the discharge. The discharge-gear is of a well-known type, and there are many alternative gears which can be substituted for it. It empties into the hopper T. Opening into the chamber B is the fire-hox U, the products of combustion from which pass over the bridge a through the arch b into the chamber E. The opening from the fire-hox U under the arch b into the chamber B can be closed by the damper c.

From the fire-hox, U, there is an opening, d, leading into the stack or chimney, e, and closable at pleasure by the damper, f. The side of the fire-hox, U, contains a superheater, g, which is furnished with inlet and discharge-pipes, h and i, attaching to suitable connecting-pipes, stop-valves, etc. Under the bridge, a, and discharging into the upper part of the inverted truncated conical portion, D, of the receiving-chamber, C, are pipes, j, which connect with a main, k, furnished with suitable connecting-pipes and stop-valves. In the upper part of the chamber, B, are holes, l, which can be closed by fire-bricks, plugs, valves or dampers.

In employing this apparatus they charge,



CLAYTON AND MACKIE'S NEW METALLURGICAL APPARATUS.

through the ordinary forms of feeding-gear, the pulp, ore, or substance to be treated, into the rotator, and this being put into rota-

tion the pulp, ore, or substance passes down through it, and coming into contact with the flame from the fire-box U or other warm gases

and vapors generated, is heated or roasted to any desired extent, and in such condition empties from the mouth A of the rotator into the receiving-chamber C. When the chamber C is sufficiently full of pulp or roast, air or steam or any desirable gas or vapor at a suitable pressure is let into the pipes P and passes into the cone N, where it is slightly heated by contact with the walls, which are surrounded by hot roast or pulp, and thence through the tuyeres M into the chamber, bubbling or boiling up through the material contained therein, until it escapes into the chamber B, whence it passes out through the rotator.

The air, steam, or gas, when it leaves the chamber B, has the same temperature as the hot pulp, roast, or material in the chamber, and in its passage through the rotator imparts its heat to the cooler material which is fed into it. The discharge-wheel Q, being put in motion as soon as the chamber is sufficiently full, draws off the roast or pulp from the chamber continuously, so that by regulating the feed and discharge the level of the roast or pulp is maintained at any desired height in the chamber.

The dampers, f and c, admit of regulating the amount of flame which passes into the rotator, and the heat therein is thus controlled independently of any regulation of the fire.

If it be desirable to use a deep fire in the fire-hox, U, and for this reason sufficient air does not pass through the grate-bars for the proper combustion of the gases generated, the air necessary for combustion is supplied to the flame by opening wholly or partially the holes l in the upper part of the chamber, B, allowing the air to fall into and descend through the hotter and lighter flame.

The supply of air for oxidizing or roasting in the rotator, or for burning any inflammable products which may be generated in the converter, is introduced under the flame from the fire-hox, U, through the main k and pipes j, and being cooler and heavier than the flame, tends to remain below it in contact with the roast or pulp in the chamber and rotator, and burn or oxidize the escaping gas, pulp, or roast.

By making suitable pipe connections with the discharge-pipes of the superheater, those using the apparatus can pass through the superheater and heat, either blast which is introduced into the cone, N, and thence out through the tuyeres, M, into the chamber, C, or the current of air which passes through the main, k, and discharge-pipes, j, over the mass in the chamber into the rotator, or even the air supplied through the holes, l, in the chamber, B, for the combustion of the flame in the rotator; and by using more than one superheater they can heat more than one of these blasts or currents. Lastly, if they choose, they can use the pipes, P and k, to introduce into the chamber or rotator gases other than air; or, by using more than one of the pipes, P, and employing one to introduce one gas or vapor, while the other introduces a different gas or vapor, they can blow into the chamber any desired mixture of gases or vapors. The skilled metallurgist would at once see that such a form of apparatus could be advantageously used for a great variety of metallurgical operations not necessary to be mentioned here; hence it will be apparent that the converter may in some cases not only suffice to accomplish a desired chemical reaction, but also become a generator of heat which could be utilized in the rotator.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Letter From a Miner.

EDITORS PRESS.—I am one of those unfortunate hydraulic miners, and have been enjoined from further working my mine either by the hydraulic or any other process, by orders from Judge Keyser's Court, therefore my occupation is gone. I don't know what to do, but think I will have to emigrate, for I cannot make a living here unless I can work my mine. I have worked in the gold mines of California more than 30 years; have made a good deal of money and lost it again; I have expended more than \$10,000 within the last eight years in improvements. I have now got my mine in a condition that I can get it all back again, and more with it, if I am allowed to work it. I am working in the bed of a creek with a hydraulic elevator, elevating all the material and dumping it on higher ground, where it is out of the way of freshets or high water. I am putting no foreign material into the creek, but I am enjoined all the same. All of the principal mines of Plumas county have been enjoined also. It is the greatest outrage that has ever been perpetrated on a free people, for it cannot be shown that the debris from the mines of Plumas county has ever done the valley a particle of harm. The fact is there is nothing that ever reaches the valley but discolored water, but there is now a clamoring for clear water. There is an attempt to make us out a lot of bandits and outlaws and even felons, but that point would not go down with the last Legislature. If we are not pursuing a legitimate calling why don't the general Government step in and stop it? But if we are, why don't they give us the same protection that every other class of citizens has? The time was when miners were all powerful in this State, but it is changed now and the Grangers can out vote them.

S. S. T.

Spanish Ranch, Cal., April 22, 1887.

Gold in California.

(Continued from our last.)

[Translated for the MINING AND SCIENTIFIC PRESS from *El Minero Mexicano*.]

An American, John Hoppe, went in 1850 from the Atlantic to the Pacific Coast, and settled near one of the cascades of the Sierra Nevada, with three companions, to fell timber. They set up their tents and proceeded to accumulate wood for the winter of that year. One day when John was digging, the pick-ax found and extracted a fragment of virgin gold from a whitish and hard earth, which revealed the nearness of an auriferous ore deposit or criadero. According to a

Report of Hon. T. Butler King.

Made in 1850 to the Government of the United States, by which he was commissioned, the auriferous region includes a surface 500 miles in length by 50 in width, its zone situated in a direction parallel to the Sierra Nevada. It contains within its limits the series of hills and cordilleras which rise on the east above the plains of the Sacramento and San Joaquin, following that direction 60 miles, terminating in the highest part of the Sierra Nevada at an altitude of 1219 meters above the level of the Pacific. From the slope of the Sierra issue a

Number of Streams.

Which increase their wealth with the rains and melted snow in their progress to the Sacramento and San Joaquin rivers. These rivers and all these rivulets have shown gold in their sands. The rocks which predominate most in the geological construction of these hills are talcose-slates and chlorites, traversed by veins of quartz presenting a green appearance. The general direction of the strata is from east to north, with a strong inclination toward the north. The eruptive rocks which have upturned these lands are, it appears, the diorites and the porphyry diorites, the land having an identity with that of the Ural mountains. The geologists who have visited one of these lands identify it with the other. Both localities are opposite, in a similar meridian, and in the northern hemisphere. Two lands, the most classical and the highest! In both countries, great contrasts of temperature are experienced, varying from snow to rains, excessive heat and dryness, especially that part of California near the coast. All these circumstances, which damage so much the animal constitution, are precisely those which most favor the decomposition of the rocks and those which occasion the auriferous deposits in the bottom of the valleys by the carriage of the detritus and disintegrations.

The Criaderos of Alta California

Are like all the auriferous deposits that we have observed—modern alluvions—very rich, containing gold in stones of quartz and some loose kernels in sands or placers, as much in the ancient rivers as in the modern; very abundant in pepitas and small grains of metal, and from whose sands is obtained by washing, a dust, the finest of gold; and lastly, veins or threads of auriferous quartz, which, when in proximity to the surface of the land, recompense amply the labors of the miner, but not, however, if they penetrate to a certain depth. The quantity of gold collected from its primitive date is impossible to calculate. The production has depended on the

number of persons engaged in digging, washing, and manipulating it, and as the placers were abundant and the veins rich, the thousands of laborers who have gathered to them have found gold, and at last they appear as if exhausted. If the United States contain immense wealth distributed among many persons, among whom are found more millionaires than in other nations of the world, California, like England in Europe, is the one which has the most. The criaderos of Siberia will be more durable because they belong to the Government and are exploited moderately; for this reason they seem to be of great richness. In the auriferous criaderos of California it has happened, as in other countries, that the exploitation has fallen principally upon the alluvions and veins, or eruptive quartzose dykes. The alluvions originate from the separation of the auriferous quartzose veins, says M. Simonin, and sometimes from the decomposition of granitic or other rocks which contain the injected gold. The principal dyke is that which, appearing in Monte Ophir, in the county of Mariposa, reappears again at Jamestown, in the county of Tuolumne, and from there as far as Jackson, in the county of Amador, having an extent of nearly 145 kilometers in direction of northwest to southeast, following a mean inclination of 60° northeast. This dyke is generally in concordant stratification between the hojillas or small leaves of the ancient slates. Its thickness varies from one to 25 meters. The third part of its length separates from the Monte Ophir and river below the town of Coulterville, and is divided into two branches which reunite themselves afterward on the height of the Pena Blanca.

The Most Important Branch

Follows in concordant stratification with the slates; but the other branch cuts them to separate itself from the first, although they again unite. The maximum separation is about two kilometers, and the total length of each branch is nearly 16 kilometers. The principal branch, which performs the office of vein-crozier (veta cruzadora), has cut in the Mary Harrison mine a vein of quartz, which has a direction from north to south, according to "Barron." In support of his opinion upon the eruptive origin of the quartzose criadero, M. Simonin cites the two following facts: 1. In some points of the height, the quartz is polished and washed as by violent mechanical friction. The streaks are parallel and are in the inclination of the criadero. Sometimes they are also in a direction diagonal to this inclination; they form upon the pieces of quartz in which they appear an impression particularly analogous to that of the calamites upon the carboniferous slates. 2. In the Mary Harrison mine a rebosadero or dissemination of chlorite and steatite has appeared at the same time as the quartz, and this chlorite is as lustrous and brilliant as a mirror in the alto of the vein; besides, the gold which it contains, frequently abundant, is in general, scattered in hojillas or small leaves outspread, and as polished as in a laminador.

M. C. Beaumont remarks that the description of M. Simonin, relative to the polishing and streaking of the quartz of the alto, adapts itself with admirable precision to certain specimens of the auriferous quartz vein de la Gardette (Isere), which the School of Mines possesses. And yet, M. C. Beaumont doubts much whether the vein, de la Gardette, has an eruptive origin properly speaking. Besides the veins that M. Simonin believes eruptive, he has recognized others called contact veins, arranged between the serpentines and the elevated slates.

Gold is Generally Found

Scattered in small crystals isolated or grouped sometimes in alambres, or in thin plates, and sometimes in bolsas or hollows. The medium richness of the quartz in the mines exploited is \$20, or 100 francs per ton. The gold contains from 4 or 5 to 20 per cent per 100 of allied silver.

In regard to the alluvions, the gold which they contain is found in a native state in form of kernels or of needles.

Duprenoy reports that the auriferous cuenca or earthen bowl of California extends from the Sierra Nevada to the Pacific; that it includes all the valley of the Sacramento, which has its birth in the mountains and submerges itself in the ocean in the harbor of San Francisco. The valley of the San Joaquin, which unites with that of the Sacramento making the parallel 38°, and the lengthened-out California mountains, complete this vast auriferous basin. The mountains which limit this valley and link together all its coasts, exhibit the ancient rocks at their base covered with a compact calx, quite modern, and crowned on many of their points by lands not often tranquil. The veins of gold which by their destruction have produced the richest alluvion of California, are found near the limit of the ancient rocks and of the calx that we have indicated. Their matrix is of quartz; many of them appear to have been objects of exploitation in times far distant.

All the Small Valleys

which unite with that of the Sacramento are auriferous. The exploitations are on the richest placers of the borders of the American river, and in the valleys of the Bear, the Yuba, the Feather and the Three Buttes. The placers of the San Joaquin are less rich than those which group themselves around the valley of the Sacramento. There are, however, some important ones in the valley of the Mariposa, which river is one of the affluents of the San Joaquin.

(To be Continued.)

Medical Advice to Prospectors.

To Keep Healthy in Hot Climates.

Dr. J. A. Nealon, late medical officer to the Akankoo Gold Coast Mining Co., writes a letter to the London *Mining Journal* concerning the means which should be adopted to keep in health on the west coast of Africa. Some of the advice given is applicable to other hot countries, and we print the letter referred to for the benefit of prospectors and miners: Very few indeed know how to adapt themselves to the circumstances of a tropical climate, and to this fact I believe a good deal of the illness and many of the deaths occurring, especially on the west coast of Africa, are due. Most Anglo-Africans bring with them the idea that the climate is exhausting, and that they must make up for loss of energy by eating. They eat more meat and a greater number of times than they do in England. At home the working man has to be content in the majority of cases with one meat meal daily. In Africa they must have three, because a company finds him in food. Three meat meals at home, with insufficient exercise, would soon produce deleterious effects, yet men expect to do the same in Africa, and with impunity. I have no hesitation in saying that most of the cases of fever I have seen were due to excessive meat eating, and to wilful and deceitful disobedience of medical orders. With regard to alcohol I have not seen its use in moderation attended with any evil results. Of total abstinence I cannot speak, as I have never known a total abstainer on the coast, either on board ship or in any of the mines. As to the particular kind of alcohol, most medical men with coast experience agree that good whisky, well diluted, is the safest and best. Claret for working men I strongly object to. All cheap clarets are very acid, and taken in quantity soon impair digestion. Lager beer is preferable if alcohol is to be given. The objection to withholding alcohol *in toto* is that men will then secretly buy trade gin and get drunk on it, as I have known them do more than once. On the abuse of alcohol it is unnecessary to dwell. The fact that three-fourths of the deaths on the coast are due directly or indirectly to it, speaks for itself. When traveling, especially over land and on foot, cold tea is the best drink to quench the thirst, which must of necessity arise. Alcohol in such cases only intensifies the thirst, and requires frequent repetition if once used. Europeans newly arrived in malarious countries are more susceptible to malaria than those longer resident. At the same time it must be borne in mind that no length of residence on the west coast will give a complete immunity from fevers, though it may lessen the attacks both in frequency and intensity. Bearing this in mind, old coasters as well as new will do well to adopt ordinary precautions, of which the following are the most important:

- 1.—Avoid undue exposure in the early morning while the fog still hangs on the ground, during the heat of the day, and after sunset when the dew begins to fall. A light repast (biscuit and tea or coffee) should be taken first thing after rising, and before leaving the house.
- 2.—Avoid getting chilled by standing or sitting for any length of time when the body is unduly heated, or by neglecting to change underclothing as soon as possible after profuse sweating.
- 3.—The use of strong purgatives is especially to be avoided; they weaken a constitution already enfeebled by tropical residence, and may bring on dysentery. At the same time, it is essential to secure a daily motion from the bowels, naturally if possible, by saline laxatives, such as Euc's fruit salts, pyretic saline, etc., if need be. Diarrhea, if persistent and painful, should at once be attended to by a change to a lighter diet and the administration of 30 drops of chlorodyne, to be repeated in a couple of hours if necessary.
- 4.—When fever comes on there is no use trying to fight against it, or work it off; by not laying up in time the attack is invariably severe in its course and longer in duration, and convalescence is retarded. Much valuable time is thereby lost which might easily have been avoided. Besides, it must be remembered that what would otherwise be a light attack may, if neglected, will end fatally, while the severest attack, judiciously treated, will end in recovery.
- 5.—Where practicable, a plunge bath should be taken every day after work, and the whole body carefully scrubbed. At home cleanliness is one of the first laws of health; in the tropics where the pores of the skin become so readily occluded from dried-up secretions, daily ablutions are imperative.
- 6.—When the premonitory symptoms which usually precede the onset of fever are felt, the patient should immediately go indoors for the remainder of the day, and take 10 grains of quinine every two hours until three doses have been taken, if no effects (noises in the ears, etc.) have been previously felt. A podophyllin pill followed after some hours by a saline draught or the latter alone will also be of advantage. If taken thus in time, and so treated—quinine, purgative, and light diet—most impending attacks will be averted.

If, however, as sometimes happens, the fever should come on, the patient should at once retire to bed, get well wrapped up in blankets, and get hot drinks (tea or coffee) to make him sweat. A purgative should also be taken if he has not already done so. After the sweating

ceases, and the temperature has gone down, which it usually does in five or six hours, 20 grains of quinine should be taken, to be followed in two hours by ten grains, if no effects have been produced by the first dose, and the ten-grain doses may be continued every two or three hours till effects are produced. Next day at the same time as the attack first manifested itself, the fever again returns, and the same treatment (minus the purgative if it has acted) has to be gone through. Returns may thus occur daily for four or five days. In all the cases I have seen the first return was the severest, subsequent ones getting less and less till the fever went off. Convalescence is usually quickly established, and the patient is able to resume his ordinary vocations, as a rule, the next day.

7.—The diet during an attack must be light—chicken broth, prepared soups, and arrowroot, with brandy and eggs in the more severe cases, where the patient shows sign of prostration. For vomiting, which is often a prominent symptom at the onset, I have never found anything effective; but when the excess of bile is got rid of it usually ceases of itself.

8.—If retching is continuous, and exhausting the patient, champagne alone or combined with soda-water given in small quantities (teaspoonfuls) frequently seems to answer best. To overcome the restlessness at night, which is nearly always present, and which if not relieved greatly exhausts the patient, an anodyne draught of chloral hydrate and bromide of potassium, 15 grains of each, dissolved in a wineglassful of water, should be given at bedtime even in the absence of a medical man; it should not be repeated, however, if it fails to have the desired effect, unless under medical supervision.

9.—As regards ordinary diet, three meals a day are quite sufficient; food should not be allowed in the intervals as is frequently done. The hours for meals best suited to working men are the hours they have been accustomed to at home. I have heard many complaints from men against tropical meal hours. It is not, however, always practicable to change the hours. The regimen they seem most in favor of was as follows: Breakfast, bread and butter with tea or coffee with or without meat; dinner, meat with fresh vegetables and fish, and if alcohol is allowed, a pint of bottle beer; supper, same as breakfast minus the meat.

Hardened Petroleum as a Fuel.

How it is Made and How Burned.

Efforts and experiments are constantly being made to utilize petroleum as a fuel. The Russians burn the waste after refining. Experiments in this country have generally been made with the natural product, just as it comes from the wells, in which condition it varies greatly in character and quality, and of course may require different conditions for being utilized as fuel.

But the most recent proposition is to reduce the natural oil to a solid substance and burn it after the manner of burning coal. This discovery comes to us from Russia. Dr. Kauffman, in his report to the Russian Government upon the matter, describes the manner in which it is converted into a solid and burned, as follows:

"Petroleum, which is a hydrocarbon of the so-called methane group, may be saponified just like the oils, fats, fatty acids and wax, thus oxidizing the oil and combining it with soda or potassa salts. For this purpose the oil is heated and from one to three per cent of its weight in common soap is added, with which it is boiled for about half an hour. After that time it will be noticed that the soap is all dissolved in the oil, and the fluid will suddenly turn into a hardened, putty-like substance, which will get as hard as stiff tallow when cold. This may be pressed into any shape desired. The substance is very hard to light and burns quite slowly, without making any smoke, with a reddish flame producing great heat and leaving about two per cent odorless, black and hard residuum. Compared with coal, it burns about three times slower, producing, if the draught be well regulated, about seven times more heat than anthracite coal. It could well be used in a stove specially constructed for the purpose, or in the old stoves if they are changed, which will not be very difficult. It is, therefore, very probable that petroleum will take the place of coal in many instances in the near future, which fact stove manufacturers will have to take into consideration."

Should these results be realized, solidified petroleum as a fuel may lay claim to the following decided advantages:

1. It is universal, abundant and cheap.
2. It may be pressed into any form desirable.
3. It burns slowly, without smoke, and produces great heat.
4. The fluid petroleum can be piped to the point where it is desired to solidify it at a less cost than coal can be carried on cars.

When the great Pennsylvania Railroad Company becomes interested in the subject, it is natural to look for early and tangible results.

THE Oregon Railway and Navigation Co. has leased its railroad to the Union Pacific. This change of management is said to give great satisfaction in Portland, as the O. R. & N. Co. has been regarded as very oppressive in its freight charges, and the U. P. is expected to pursue a more liberal policy.

The Mining Outlook in Amador County.

The outlook for the mining interests in Amador, says the *Ledger*, was never brighter than at the present time. There is a renewed activity all along the line. From Plymouth to Jackson, prospecting is being actively pushed ahead. The New London and Chicago mines near Plymouth continue to give every promise of turning out good paying properties. The addition of 40 stamps to the Pacific mill, which will give the Plymouth Consolidated mines a capacity of 160 stamps—probably the largest number of stamps operated by one company in the world—will soon be pounding out the gold from its native matrix. This wonderful mine, notwithstanding the steady drain upon its resources which has been going on for so many years, shows no signs of decay. The ore body is vast enough to give the 160 stamps, crushing over 300 tons of quartz per day, employment for an indefinite period. Should the New London and Chicago properties develop into gold-producers, Plymouth will become the liveliest if not the most populous mining town in the State.

The country between Plymouth and Amador is also showing up prosperously. The group of mines comprising the Loyal Lead, North California, North Gover, Potosi, Pennsylvania, Cosmopolitan and others, located near the Black Hills, or the region known as the lava beds, which has already yielded so handsomely in precious metal by superficial working, are generally believed to be in the center of as rich a portion of the mining belt as there is in the county. It is more than probable that all that is needed to develop rich and permanent mines in this district is the judicious expenditure of capital. The Loyal Lead, as far as its development has been pushed, shows up well. It looms up as one of the big mines of the future, and a number of other claims thereabout will undoubtedly respond to the expenditures of a little capital by opening up in an equally satisfactory manner.

Around Amador the outlook continues flattering. The famous Keystone moves on in its career of gold production as of old, and the South Spring Hill, the young giant of the county, is as strong as ever. The Original Amador is taking on a new lease of life, after lying dormant for a number of years.

The resumption of work on this Wildman is not unlikely to restore Sutter Creek to its old-time prosperity.

Around Jackson everything wears a prosperous aspect. The Kennedy is evidently destined for a long life of gold production. It has now passed through the experimental stage and may safely be ranked among the steady mines of this section. The last cleanup, it is freely reported, was very satisfactory. The ore is low grade, probably not yielding more than \$5 per ton in free gold, but this yield will leave a fair margin for profit. The Zeile is looking as well as usual. This is perhaps the lowest grade of rock worked in the county, but the mine pays running expenses, if it does not put dividends into the pockets of its owners.

Altogether there are nearly 500 stamps in operation in the county. Taking two tons as the average daily capacity, this would give 1000 tons of quartz crushed every 24 hours. This is a greater number of stamps in activity than Amador county has ever witnessed in her history. Taking \$6 as the average yield per ton of quartz, we have a monthly output of \$180,000, or \$2,160,000 per year, which is probably not far from the truth as regards the ratio of our contribution to the world's supply of gold. And basing our judgment on present prospects, the outlook is favorable for the output increasing rather than diminishing for many years to come.

A PENNSYLVANIA COMPANY has received a contract for the manufacture of 1,000,000 blocks of slag for paving purposes. This is a good way to utilize slag.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

RIVET.—Matthew Arnold, S. F. No. 361,360. Dated April 19, 1887. This improved rivet is intended for securing flexible materials, such as leather, etc., together. It consists of a rivet having a circular head in combination with legs or extensions projecting at right angles therefrom, these legs being corrugated or fluted longitudinally.

APPARATUS FOR TREATING NIGHT SOIL.—W. E. MacIvor, Sydney, New South Wales. No. 361,367. Dated April 19, 1887. This relates to the treatment of night soil, so that its products are merchantable commodities. The object of the invention is to profitably dispose of night soil. The products of the process are a measure of marketable values and sulphates of ammonia. The patent covers an apparatus for the treatment of this night soil.

WOVEN FABRIC.—Robert H. H. Hunt, S. F., assignor to the Hunt Automatic Loom Company. No. 361,360. Dated April 19, 1887. This improvement in woven fabrics consists in

The Anaconda Smelter.

The Greatest Copper Smelter in the World.

The statement was made last year, says the *Anaconda (M. T.) Review*, that the Anaconda Company owned the largest copper plant in the world. The statement will have to be enlarged in some way this year, because the plant has been enlarged and improved in many ways. Any one who had been absent from the smelter for a year would now scarcely be able to recognize it. At the upper works the new machines-shop, the tailings building and the extensive addition to the concentrator have been the principal external improvements.

The changes inside appear even more extensive than those on the outside. Last year the difficulty that the works had to contend with was that the 26 furnaces overbalanced the producing power of the concentrator. It was probably this fact which first led to the idea of building a new concentrator. This deficit has now been made up in a simple manner. The delivery of ore in the concentrator was made automatic, and a steam stamp, with a capacity for treating 200 tons per day, was added to the concentrating plant. Last month offered the first opportunity for a continuous test. The whole 26 furnaces were kept running all month, and the concentrator got so far ahead that it

not done, as it appears now, the whole work of building the lower concentrator will have been wasted. We have heard rumors of the letting of contracts for the construction of smelting furnaces, but so far have been unable to verify them.

Notes.

Otto Stallman, on Friday, was appointed superintendent of the entire concentrating plant at Anaconda, including both the upper and lower works.

Thirteen carpenters are busy at the lower yard, making the framework for a new tailings-mill, 50x155 feet. The framework will be brought to the upper works as soon as completed, and the building put up just across the track from the present tailings-mill. The last year has been a pretty hard one on Anaconda on account of the long shut down. This spring opens up, however, with the prospect of a more prosperous season for the Smelter City than she has ever before enjoyed.

A Freak of the Yucca.

To those crossing the Mojave, the yuccas are objects of constant interest. Their verdure in the midst of arid wastes is a great surprise. The strange and almost fantastic forms which they assume excite wonder and give full play

to the imagination in investing them with grotesque significance. The correct form of the tree is upright, with quite a symmetrical arborescent outline; but their insecure rooting in the desert sand places them at the mercy of the frequent windstorms and they are seen distorted and misshapen. The engraving shows one of the most interesting of these freaks to be seen on the desert. The top has evidently proved too heavy for the trunk, and it has gradually sunk to one side until it has returned to the plain and become imbedded in the sand. Storms have no doubt contributed to this result, but the trunk was too strong to break and the rooting too secure to let go its hold, and the result is that the tree assumes arch form, and now, braced at both ends, bids fair to defy the elements for years to come.

Our engraving is from a copyrighted photograph by C. R. Savages, now a resident of Salt Lake City, and our reproduction is by his special permission. The arch is broad enough to allow several horsemen to ride abreast beneath, and its height, as shown by the figure of the man, is probably from 12 to 15 feet at the apex. From the upper surface, as the picture shows, a single branch has approached this vertical as nearly as possible, and may yet form quite a tree-head at this point.

This yucca of the Mojave is the tree from whose trunk most excellent pulp is obtained for paper-making, and its manufacture is now being carried on by an English company, furnishing paper stock for the *London Telegraph*, as has already been described in our columns.

EXPERT MINING PROSPECTORS.—Jas. Bannalack yesterday received a letter from Georgetown, British Guiana, from the agent of a mining company who desired him to secure the services of two expert mining prospectors, who understand their business and know how to rough it. They are wanted to prospect for quartz and placer diggings in the newly discovered gold fields in British Guiana, near the boundaries of Venezuela. The placers are already yielding well, but quartz veins have not yet been discovered, and a London company with an ample capital, has been organized for that purpose, and it is proposed to prospect the country thoroughly to find quartz. Mr. Bannalack is authorized to send two of the right kind of men, who will be paid good salaries, and their expenses on the trip. The journey is a long one from California, being by rail from here to New York, thence by steamer to St. Thomas, in the West Indies, at which point another steamer is taken to Georgetown, Demerara, British Guiana. From Georgetown the travel is by river steamer to within 70 miles of the gold fields, the latter distance being made in small boats.—*Grass Valley Union*.



Photo. and Copyright by C. R. Savages.

CURIOUS GROWTH OF A YUCCA ON THE MOJAVE DESERT, CAL.

a novel combination of the warp and weft, and especially in the construction of the selvage. In this ordinary woven fabric, the thread is reeled off the bobbin and laid in by the passage to and fro of the shuttle in one continuous thread, while in this improved fabric the thread forming the filling is cut in pieces the length equal to about twice the width of the fabric, and laid in so as to interlock and bind the selvages.

ELECTRIC ARC LAMP.—Gustav A. Wisse, S. F. No. 361,663. Dated April 19, 1887. This may be best described without going into the details of the operating mechanism as follows: The lower stationary carbon and upper moving one, with the controlling escapement, gearing and pinion by which the rack carrying the upper carbon is allowed to move downward by gravitation, in combination with a frame horizontally fulcrumed, and having the escapement pivoted upon one side of its fulcrum and the escapement wheel upon the opposite side, and an electro-magnet with which one end of the frame is connected, so as to be raised and throw the escapement out of action. The horizontally fulcrumed frame has one end connected with the armature of the magnets so that it is raised or depressed by the varying resistance of the current. In this way the carbon-carrying mechanism and its carbon is stopped when it has approached to a proper distance from the negative carbon.

The Carbondale mine, Alum creek, has joined the ranks of the producing mines of Nevada.

had to be shut down for five days. The product of the furnaces for the month of March was 4070 tons of matte, which considerably exceeds the output for any preceding 30 days in the history of the works. These are facts and figures for the grumblers, and especially for the New York *Engineering and Mining Journal*, which last week displayed its underhandedness by estimating the Anaconda's output for this month.

The number of men now employed at the upper works is about 600. The details of the work have been so perfected that this number of men is amply sufficient to carry on the work, though they seem lost in the vast buildings.

Work is still progressing at the lower works. Some 30 carloads of machinery has already arrived and is being placed in position. A large part of the machinery is for the 60-stamp silver mill, which will be the first part of the lower works to be gotten under way. It is the intention of the company to provide the concentrator with three steam stamps similar to the one in use at the upper works. The machinery for one of these stamps has arrived, and the work of placing it in position has begun. Supplied with three of these stamps the new concentrator will be able to produce 400 tons of concentrates daily. This will require the hauling of 1200 tons of ore daily from Butte, or, in other words, will exactly double the capacity of the largest copper-smelter in the world.

Now, the idea which at once suggests itself is: What is going to become of all these concentrates? The upper concentrator is now more than able to supply all the furnaces that the company owns. Hence the building of furnaces at the lower works seems inevitable. If this is



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A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, May 7, 1887.

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Passing Events.

It is reported that the old placers and the silver mines which were formerly worked by the Aztecs have been found in the Sierra Madre mountains, Mexico, by a party of prospectors.

The Anti-debrie Association officially announce that it has no contest with quartz or drift miners, notwithstanding assertions to the contrary.

Quite a boom is expected in Montana mining matters this season. Of course, Butte is the center of mining operations in that Territory, but there are several other camps which are making a very good showing.

The mining men in the Territories are very much excited over the probable workings of the Alien Land law, which they fear will entirely prevent English and other foreign capitalists from investing in mining properties. The law applies only to the Territories.

It is evident that the quartz interests of California will be further advanced this season than ever before. From all parts of the State, accounts come which give good promise of the future.

MINING DIVIDENDS in April aggregate \$268,000, as follows: Homestake Mining Co., \$25,000; Con. Cal. & Virginia Mining Co., \$108,000; Ontario Mining Co., \$75,000; Paradise Valley Mining Co., \$10,000; Plymouth Con. Mining Co., \$25,000; Silver King Mining Co., \$25,000.

The So-Called "Alien Act" and its Effects.

Congress at its last session passed a law by the provisions of which no person not a citizen of the United States, or who has not declared his intention to become such, can acquire, hold or own any real estate in any of the Territories or in the District of Columbia, unless it be acquired by inheritance or in the collection of a debt by ordinary process of law; this inability applying, also, to any incorporation not created by or under the laws of the United States or of some State or Territory. Under this law no incorporation or association whatever, more than 20 per cent of whose stock is owned by foreigners, can acquire or hold any real estate in any of the Territories or in the District of Columbia. Under this law no incorporations, except such as are organized for building railroads, canals or turnpikes, are allowed to own more than 5000 acres of land in any of the Territories; nor can any company organized for building such structures own any more land in the Territories than is necessary for operating the same, unless such land has been granted to it by Act of Congress. Any land acquired and held in violation of the provisions of this law is liable to be forfeited to the United States.

This Act of Congress, of which the above is a synopsis, appears to us to be open to criticism. In the first place, it seems to have been drafted in a loose and careless manner. What does the author of this law mean by "territories in the District of Columbia," as he has it in the last clause of the second section of the Act? Or why does he speak of the "territories," commencing the word with a small "t," as if he supposed they consisted of unsegregated portions of the public domain instead of representing organized political divisions of the country?

Though obscure in its meaning and faulty in its style and phraseology, this law is open to other and more serious objections. Indeed, we are at a loss to guess why it ever was passed at all. Granted that it will be repealed at the next session of Congress, that fails to satisfactorily explain the reason of its enactment! Of course, we know that it was ostensibly designed to prevent the further acquisition of large tracts of farming and grazing lands by foreigners. But why extend its provisions to mines and mining properties? Who was complaining because foreigners were investing their money in real estate of this kind, or what possible cause could there be for such complaint? None whatever! The owners of mines in the Territories were only too anxious to have them do so. To the Old World, with its cheap and abundant capital, they naturally looked for aid. To induce these people abroad to assist them with their ample means is what these miners have been laboring to accomplish from the first. Overlooking the many losses they had in times past sustained in mining ventures, these people, beginning once more to regard this class of investments with favor, had been turning their attention strongly of late to these west-lying Territories of the United States.

At this juncture, when foreign investors were beginning to take a lively interest in our mines; when the sales of many valuable properties were being negotiated abroad, and millions of unemployed English capital was about to be transferred to this country, Congress in its wisdom enacts a law that not only tends to discourage foreign investment in our mines but may have the effect to prevent it altogether. From every quarter we hear of the mischief it is likely to cause, and has, in fact, already caused. We see it stated in the *Engineering and Mining Journal*, by a party claiming to be conversant with the facts, that sales of mines in Idaho alone to the amount of \$10,000,000, pending in England and Scotland with every probability of being consummated, have already fallen through and been abandoned in consequence of this law. That Montana has from this cause suffered to an equal, and the other Territories to a proportionate extent, may reasonably be inferred. But the injury already caused will be as nothing compared with what will in the long run result from this ill-advised enactment.

The English, if late accounts from London may be believed, have, with much unanimity, determined to give our mines the "cold shoulder," and turn their attention to those in their own colonial possessions and in other countries. Of such significance did London manipulators of

South African mines consider this Act to be that they cabled the whole of it to the Caps of Good Hope the moment it came to hand. This effect of the measure in the British metropolis is described by a correspondent of the New York *Times* as follows:

"The detailed provisions of the Alien Land Act, when made known here, created the greatest excitement in financial circles. One great city speculator tells me that not less than 300 big American land schemes are knocked in the head by it. For years London has been full of American promoters of all sorts—mines, ranches and estates, to sell or float in companies—these ranging all the way from millionaires to needy adventurers. These gentry are now conscious that they have sustained a grievous setback. Dorsey, who recently gave a great and ostentatious dinner here, is now in Holland, where he was negotiating with an Amsterdam company to buy a tract of several millions of acres in New Mexico, with a view to selling it here to a London syndicate if he succeeded. He is now badly left, since he will be unable to find a purchaser either here or in America, Rufus Hatch is also here, trying to unload a nice little ranch, and finds himself high and dry. City investors and agents are in almost a state of panic, since it is uncertain how deeply the clause forbidding aliens to have even an indirect interest in land may shake mortgages and loan companies. The Mines Company of Gresham House, the biggest concern of negotiating agents in Europe, has passed a resolution that hereafter it will refuse to deal with any and all American mines, lands, and securities in the Territories, even if the way is found to evade the law. The fact has scared the heretofore credulous English public out of all notion of touching American investments."

If the foregoing statements do not grossly exaggerate the feeling aroused by the enactment of this law in England, it is going to inflict serious and all but irreparable injury on two of our leading interests; irreparable because if the law is repealed that will not repair the harm it has already done. Confidence destroyed and capital diverted into other channels cannot be restored in a day nor by any legislative proceeding. What renders this whole business the more stupid and provoking is the fact that there existed for this law no necessity whatever. Its enactment was wanton and uncalled for both as it applies to these wild lands and the mines. No public interest demanded, and no intelligent portion of the community asked for it. The author of the bill, one Payson, a member of Congress from Illinois, doubtless supposed he could make some political capital out of it by catering to the prejudice entertained by certain classes against foreign investors. This person, when questioned, admitted his ignorance of mining matters, and the probable effect the measure would have upon that industry. That this bill was suffered to become a law was due probably to its having been passed at the very close of the session, whereby it escaped the scrutiny of the other members of Congress. That it meets with universal condemnation throughout the mining regions it is needless to say.

Napa County Quicksilver Mines.

We had a conversation this week with a gentleman from Napa county, from whom we gather the following information concerning the quicksilver mines: The Etna Consolidated Company is at present doing little in the way of taking out ore. They have been engaged in sinking the shaft at the Star claim, where they are vigorously at work. They have run back from the bottom of the shaft about 130 feet, and in another month hope to strike the vein and ore. Then the coarse-ore furnaces will be started. At present they are running only the continuous-feeding coarse-ore furnaces. The company's mines are now yielding from 125 to 130 flasks of quicksilver per month. When the coarse-ore furnaces are also at work the mines yield about 275 to 350 flasks per month. At present 35 men are kept at work, but when all the furnaces are running full blast 125 men are employed.

The Oat Hill mine, owned by the Napa Consolidated Company, is being worked with more or less vigor, and one furnace is running.

Some new prospects are being started up in the vicinity of Middletown. Two new furnaces have recently been built at Middletown on a new claim. The claims in that vicinity have produced comparatively little mercury so far.

W. P. STOUT, who has been for a long time one of the trustees of the Mechanics' Institute, has resigned and has been appointed general agent of the Mechanics' Fair, at a salary of \$150 per month, his duties to commence May 5th.

Sewerage of Cities.

The city of San Diego has adopted a wise course in employing the distinguished sanitary engineer, Col. Geo. E. Waring, Jr., of Newport, R. I., as consulting engineer, for the purpose of advising a system of sewerage.

In conversation with Col. Waring, we learn that the proposed sewerage of San Diego is as follows: A main-intercepting sewer runs along the lower part of the city in which three other main-intercepting sewers enter. The topography of San Diego is very favorable for sewerage. The grades of the streets are sufficiently steep to secure a rapid flow. The largest pipe of the main-intercepting sewer is 24". All sewers are ironstone pipes. The end of every branch is provided with an automatic flush-tank, discharging about 20 feet of water every 24 hours, clearing the branch sewers. The outlet is 24" cast-iron pipe, which carries the sewage from the intercepting sewer into an automatic tidal reservoir, filling at high tide and discharging at low tide. From this tank the sewage is carried by a 30" cast-iron pipe into the deep channel of the harbor, which carries it out to the ocean. This system is perfect. The city of San Diego has issued \$400,000 bonds, 5% interest, and redeemable in 20 years. The specifications for all the work are advertised for a period of 20 days in the *San Diego Union* and the *San Francisco Chronicle*.

Col. Waring uses the separate system. The difference between the separate and combined systems is, that no rain-water is admitted into the sewers in the separate system. In Colonel Waring's work on "The Sanitary Drainage of Houses and Towns," pages 133, 134 and 135, the following paragraph occurs: Sewers choke and overflow during heavy storms mainly because they are too large for the work they are ordinarily called on to perform. If a sewer is so small that its usual flow is concentrated to a sufficient depth to carry before it any ordinary obstruction, it will keep itself clear. But if, as is almost always the case, where the engineer lacks experience, or where he defers to the ignorance of the local authorities, it is so large that its ordinary flow is hardly more than a film, with no power even to remove sand, we may be quite sure that its refuse solid matters will gradually accumulate until they leave, near the crown of the arch, only the space needed for the smallest constant stream. And, in order to make room for a rainfall flow, the whole sewer will have to be cleared by the costly and offensive process of removal by manual labor. A smaller sewer would have been clear by its own flow. The smaller and broader the stream, the more the friction against the bottom and sides, and the greater the retarding of velocity. A brick will stand unmoved in a shallow stream of water running sluggishly through a 15" drain, while if the same stream were concentrated into one of 5" drain it would have so much greater depth, force and velocity that the brick would be entirely covered and swept away.

One principle is very apt to be disregarded in regulating the sizes of sewers; that is, that after water has once fairly entered a smooth conduit having a fall or inclination toward its outlet, the rapidity of its flow is constantly accelerated up to a certain point, and the faster the stream runs the smaller it becomes; consequently, although the sewer may be quite full at its upper end, the increasing velocity soon reduces the size of the stream, and gives room for more water. It is found possible, in practice, to make constant additions to the volume of water flowing through a sewer by means of inlets entering at short intervals, and the aggregate area of the inlets is thus increased to very many times the area of the sewer itself. Where a proper inclination can be obtained, a pipe 18" in diameter makes an ample sewer for a population of 10,000.

The presence of Col. Waring on this coast has caused other cities to take advantage of his experience, and several have requested him to examine their ground, in reference to a system of sewerage, among them Los Angeles.

The city of San Diego, in this prompt movement, has acted more wisely than any other city or town in California.

San Francisco is the worst-sewered city in this State. We have no system at all. All brick sewers are 3'x5', without consideration of the number of persons contributing to them; in many cases the sewers do not join any main branch. There are a great many instances

where sewers along one street are of different sizes. For instance, on Washington street, from Drumm street to Mason street, brick sewer, 3'x5'; the elevations at the crossings of streets of this part of the street are: Drumm, Davis, Front, 0'; Battery, 1.75'; Sansome, 3.5'; Montgomery, 6.0'; Kearny, 28'; Dupont, 64'; Stockton, 102'; Powell, 152'; Mason, 182'.

From Mason street to Taylor (one block) 16" cement pipe; Taylor to Jones (one block) 18" ironstone pipe; Jones to Leavenworth (one block) 16" cement pipe; Leavenworth to Hyde (one block) 18" ironstone pipe. The elevations at the crossings of streets are: Mason 182'; Taylor 252'; Jones 332'; Leavenworth 305'; Hyde 255'. The area drained by this sewer is 13,500 square feet. At Battery street, a branch sewer joins this sewer, a 3'x5' brick sewer; the elevation of the crossings of streets are: Jackson 1.75', Pacific 4.7', Broadway 12.0', Vallejo 10, Green 7.5, Union 5.0, Filbert 2.5.

This example is sufficient to prove that no system of sewerage whatever exists in this city. The worst feature of our sewerage is that all main sewers discharge into the bay at the ferry landings and wharves.

The Mayor and Board of Supervisors should take advantage of the presence of Col. Waring in this city, and employ him as consulting engineer for a new and effective system of sewerage. The State Board of Health has often called the attention of the Board of Supervisors to the danger threatening the city from the exceedingly bad sewerage; cases of diphtheria are frequent here, and if the cholera should be imported here from Mexico, and Chili, and Peru, where it now prevails, no quarantine will help to prevent its introduction. San Francisco is a large city, and has, in fact, no system of sewerage, so that it should follow the example of the wise action of San Diego.

Production of Gold and Silver.

The estimate of the entire production of gold in the United States since 1804, as given in the report of the Department of Mineral Statistics, U. S. Geological Survey, amounts to \$1,708,715,670; the corresponding total for silver is \$792,283,217; total yield of both metals equals \$2,500,998,887. (In 1885 California ranked first in gold, eighth in silver, and second in the combined production, as compared with other States and Territories.

The above estimate is based on the following figures: Output of Southern States from 1804 to discovery of gold in California in 1848 (based on estimates of Prof. J. D. Whitney), \$13,243,475. Product from 1848 to 1879, inclusive, by fiscal years, gold, \$1,480,041,532; silver, \$422,722,260; total, \$1,902,763,792. Fiscal year ending June 30, 1880 (census figures), gold \$33,379,663; silver, \$40,110,957; total, \$74,490,620. July 1, 1880, to Dec. 31, 1880 (estimated on the basis of half product of fiscal year 1881 in Mint Report), gold \$18,250,000, silver \$21,050,000; total, \$39,300,000. Calendar years 1881 to 1884, inclusive (as reported by Director of Mint), gold \$128,000,000, silver \$184,800,000; total, \$312,800,000. Calendar year 1885 (reported by Director of Mint) gold \$31,801,000, silver \$51,600,000; total, \$83,401,000.

These make the sum totals given in the first paragraph above. The annexed diagram shows the varying production for each year up to Dec. 31, 1885, of the whole United States.

MINERAL LANDS.—The Secretary of the Interior has advised the Commissioner of the Land Office to request the California & Oregon railroad to relinquish Section 27, Township 24 north, Range 3 east, in the Marysville land district, and if the company refuses to relinquish the same, to bring suit to recover. It appears from the report of Special Agent Rainey that the section of land in question is gold-bearing mineral land, and that therefore the company is not entitled to it under its grant.

WALTER E. DEAN, one of the trustees of the State Mining Bureau, before leaving on a visit for the East and Europe, left his resignation with the Governor. George W. Grayson, of Oakland, has been appointed in his place. Mr. Grayson is well known among the mining circles, and has large mining interests.

The output of coal from the coast collieries is easily supplying the deficiency caused by the scarcity of foreign descriptions.

Prosperous Quartz-Mining Centers.

In contemplating some of the prosperous quartz-mining centers of California, few persons are aware of the ups and downs they have experienced and the struggles their present advanced position has cost them. Take Grass Valley for example, now one of the most active quartz-mining localities in the State—who, looking at it to-day, would suppose it had ever had its setbacks and reverses? And yet it has had to encounter these even in the flash days of gold mining, as is shown by the following, extracted from a sketch of the place, prepared by the Hon. A. A. Sargent, and published in 1855:

As late as January, 1851, there were but three or four cabins in Grass Valley proper. Shortly after, the population increased rapidly and an attempt was made by the people to change the name to Centerville, as there were so many places known as Grass Valley it was difficult to have letters properly sent. The growth of Grass Valley in 1851 was most remarkable. Probably no town in the State has ever sprung so suddenly into importance. Much of this was owing to an excitement in reference to quartz mining, then in full operation. The first piece of gold-bearing quartz was picked up on Gold Hill in September, 1850, by a German, who disturbed it with his foot while

Conway & Preston in the fall of 1851, and is now working profitably. Col. Richardson erected one in the summer of 1851. The Mount George mill was erected about the same time. In 1852 the French Company erected a mill; the Rocky Bar Mining Co. and James Winchester in the same year. The latter has been used only for lumber, though originally designed for quartz. The Union Co. constructed a mill in 1853, but the lead was abandoned and the mill removed.

The first quartz mining was on Gold Hill, the next on Massachusetts Hill, where the first claims were taken up in December, 1850, by A. Delano, generally known as "Old Block." We believe the "chips" did not snit him, so he turned his attention to expressing for Wells, Fargo & Co., in which position he occasionally expresses the ideas that have made him so generally known in the State.

In continuance of the above reminiscences it may be added that in 1851 Commodore Stockton put up two quartz-mills, one in Mariposa and one in Grass Valley, the crushing being effected on the plan of the pestle and mortar, the cam being so arranged as to partially revolve the former. In these mills a separate mortar was provided for each stamp or pestle. The first blankets employed for catching gold in California were introduced by Melville Attwood, in the Gold Hill mill. Here also the



ANNUAL PRODUCT OF GOLD AND SILVER IN UNITED STATES.

carrying a bucket of water. The piece was sold by him to F. Squire for \$5, and proved to be worth \$100. Several of the miners of the neighborhood, and a good many from Deer creek, immediately went on to the hill and broke up the pieces of quartz which lay exposed, but as they found nothing, the excitement died away till the 1st of November, when a party—of whom James Huff was one—in getting out rock for the chimney for a cabin they were building on Gold Hill, struck a quartz ledge, where it was rich. Claims were immediately staked off, and men began to pound the quartz in mortars with spring poles. Huff's company took out about \$20,000 in ore; this was during the winter and spring. The first quartz-mill was built in January, 1851, on Wolf creek, nearly opposite the present Empire mill, by two Germans, for Mr. J. Wright, Jr. The building still stands. The mill (a water-mill) was a small affair and not successful, but it was the second one built in the State, the first mill being built in 1850, in Mariposa county, which also proved a failure. Grass Valley claims the first successful quartz-mill in California. In the winter of 1850 and 1851, Messrs. Sowers, Abby & Ridgell built a small steam-mill. In the spring of 1851, Judge Walsh erected a quartz-mill, which he afterward sold to Collins & Crossett, which mill has always paid. The Gold Hill Co., about a month afterward, commenced the erection of a mill, and Judge Walsh another one later. An English company, called the Agua Fria, bought the interest of the proprietors in the mills and leads in August, 1852, and still conduct the business under the superintendence of Melville Attwood. The new Helvetia mill was erected by

first shoes were added to stamps, these too being the invention of Attwood. This gentleman before coming to California having had much practical experience in quartz mining—gained in South America—was able to render valuable service to the young industry in this State. For advice and aid freely rendered, Attwood has an abiding place in the memory of our pioneer quartz miners.

Early in the history of Grass Valley the Allison Ranch, the Empire, and other notable mines, ran their brilliant careers and subsided. In the Empire, the notorious Lola Montez, then a resident of the town, was a large owner. From its profits this woman obtained most of her wealth, at one time considerable, though she at last died poor.

Scarcely any town in the State suffered more from outside excitements than Grass Valley. The Fraser river stampede having taken away in 1858 many of the working miners, the Washoe heira in 1860 robbed her of her moneyed men, millwrights, metallurgists and other skilled miners, leaving the place for a time poor indeed. But she has long since recovered from these disasters, standing to day one of the most thrifty and progressive quartz-mining towns in the country. Besides many valuable new mines developed since the era of her decadence, several of the old ones, after a long season of idleness, have been resuscitated and are now yielding splendidly, with the promise of a long life ahead of them. That other of these neglected properties will in like manner be restored to a profitably productive condition, there is good reason to believe, there being but few mines in the neighborhood that are probably dead beyond resuscitation.

Quartz and Drift Mining.

The hydraulic miners of this State made a strong fight for what they considered their rights, before the courts in a litigation that lasted some years. The decision was against them, as is well known, and they were enjoined from doing further work on their mines. This decision virtually destroyed their property, since they were no longer allowed to use it for profit, and it had no value for sale. Thousands of men were thrown out of employment, and property worth millions was rendered valueless. The controversy was a most unfortunate one for the hydraulic miners and for the State, but it was one which was bound to come. As to the merits of the decision, they have been discussed thoroughly by all interested, though those who were injured will never be convinced that they were justly dealt with.

Toward the latter end of the litigation, effort was made to draw into the controversy the owners of quartz and drift mines. The hydraulic miners had been compelled to advance large sums for legal expenses, and they desired the assistance of quartz and drift miners, as money was not plentiful. Those miners not engaged in hydraulicking, however, generally refused to place themselves in the position of defendants, when there were no complaints against them.

It was perhaps natural that the hydraulic miners should seek pecuniary assistance from men in other branches of the same vocation. But the judgment was, to say the least, questionable, that would draw these men into litigation against their will, or that would in effect cause them to confess that they were engaged in a pursuit that the courts afterward, whether justly or not, decided to be illegal.

While there may have been an exception or two, the quartz and drift miners generally have not been interfered with. And we are not among those who ever thought they would be. While some hot-headed and fanatical enemies of the miners may have desired such interference, it was not a thing which those who were fighting the hydraulic debris proposition would have urged as a body; and if they had, it is not at all probable the courts would have upheld them. Even should such a thing, however, have been possible, the debris from this class of mines would easily have been disposed of to the satisfaction of all, as it is now.

It is rather remarkable, it may be noted, that the effort to draw the quartz and drift miners into the debris controversy was fostered more by some of the hydraulic miners than by their avowed enemies. But no man with a quartz-mining property, particularly, has been deterred from pursuing his work for fear of injunction based on the Woodruff decision, and drift mines are being worked in all directions. While the quartz and drift miners very naturally sympathize with their brethren of the pick and pan, it would have been a poor business proposition to place themselves in a necessarily embarrassing position in order to assist them.

The mere bringing up of the question of accountability in the matter of quartz and drift mines, and making it a subject of frequent public comment, was calculated to more or less prejudice these interests, and, as a result, the gold-producing interests of the State. It was had enough to actually stop the production of hydraulic mines, without suggesting that other branches of gold mining were in danger of stoppage too. It would destroy the confidence of intending purchasers, and hinder development as well. For these reasons the PRESS has had less to say concerning the subject, for it never saw any real danger to these interests. The matter is only mentioned now for the reason that official action by those parties who have been fighting the hydraulic miners for years, has been taken, and they officially declare they never had any intention of interfering with the other branches of mining.

At a meeting held at Marysville, May 2d, the directors of the Anti-debris Association and their advisory committee of 40 unanimously adopted the following:

WIRELESS. It is continually reiterated by the hydraulic miners and their organs, notwithstanding the repeated assertions to the contrary by the Anti-debris Association of the Sacramento valley, that our people are hostile to all kind of mining, and that we intend to enjoin the quartz and drift mines; therefore be it

Resolved, Once more by the directors of the Anti-debris Association and their advisory committee, that we have no quarrel or cause of action against quartz mining, and none against drift mining when legitimately conducted as in the past.

MECHANICAL PROGRESS.

California and Oregon Woods for Decoration.

The natural woods of California are beginning to be largely used for decoration—for the interior finish of expensive residences. They have been used quite extensively, indeed, for eight or ten years, both at home and abroad. The woods most generally used are the redwood, the white cedar, the laurel and the eucalyptus. The redwood takes the lead for general use, and is largely used for interiors. It will take a good polish, and is the best cheap wood for finish that California produces. For general use, wear and staying qualities it has no superior in any forest in the world. The laurel is smooth, firm, beautifully figured, and altogether a most desirable wood. The value of the eucalyptus as an ornamental wood has only quite recently become generally known. Its grain is much like that of the Eastern beech—has waving lines close together. At the East it is called buttonwood. It is quite tough and strong, qualities which give it value for veneering. At several of our Mechanics' Fairs have been shown excellent exhibits of California fancy woods—plain and polished—which have greatly surprised people, both at home and from abroad, who have not familiarized themselves in regard to what California forests can do in this way of such desirable products. A similar exhibit was made by the C. P. Railroad Co. at the Centennial Exposition in Philadelphia.

Oregon Woods.

Oregon is also able to make a fine display of woods. The Oregon ash is a very pretty and useful fancy wood. It is figured with concentric curves and admits of a good polish. The maple of that State is also beautiful. It looks very well in furniture and is beginning to be sought after for such purpose by manufacturers in San Francisco. Light yellow in color, its surface is covered with small, wavy lines. A somewhat enthusiastic writer says: "It reminds one much of a sheet of burnished gold, and when the gaslight plays upon its burnished surface the effect is grand." Still, like most of the Oregon woods, it is but little known. Indeed, aside from the world-renowned redwood, the real beauties of either Oregon or California woods are but little known. They are known only to the few who have become efficiently interested in them to make them a study. It is only such persons who are anything like fully aware of the undeveloped industry which lies dormant in the beautiful figured woods of the Pacific Coast.

THE NEW STEEL GUN.—The army ordnance officials are quite jubilant over the results obtained last week at Sandy Hook with the new 8-inch steel gun, which was recently hooped to the muzzle after having been fired successfully 24 rounds. Since the rehooping, the gun has been fired 19 rounds, making 43 rounds in all. The ordnance officers who witnessed the trial report that during the last firings, the gun, with a powder charge of 110 pounds and a 289-pound shot, gave the following results: Initial velocity, 1878 feet; pressure, 36,000 pounds per square inch; energy, 7066 foot-tons. With a 302-pound shot, the powder-charge and density of loading being the same, the results produced were: Velocity, 1857 feet per second; pressure, 37,000 pounds per square inch; and energy, 72.19 foot-tons, which is equivalent to an energy of a shot of 289-pound weight with a velocity of 1,893 feet per second. These results are considered equal to those given by the Krupp 8½-inch gun, and considerably in advance of anything produced by guns of similar dimensions.—*Army and Navy Journal*.

AN IMPROVEMENT IN THE SHUTTLE.—A man named Thompson, of this city, has patented a device which is attached to loom shuttles, for the purpose of doing away with the necessity of drawing the weft with the breath in order to get it through the "eye" of the shuttle. This continual drawing in of the air laden with dust is the most fatiguing part of a weaver's work. The new arrangement which is simple, consists of a longitudinal groove at the "eye" end of the shuttle, which returns at an angle, slipping the yarn into the "eye." The groove is lined with a thin metallic plate to regulate the "draft" and prevent "fuzzing." It has been tested by practical weavers, and it gives perfect satisfaction, the threading of the shuttle being done as quickly as by the old way.—*Fall River Globe*.

STEEL IN LOCOMOTIVES.—A change of some moment is being made in the construction of the locomotives of the Northeastern Railway of England. Hitherto the hulk of the locomotives on that line have had their boilers made with plates of iron—the iron of some of the South Yorkshire firms; but now steel plates are being used, and steel axles are also being substituted.

STEP CONE FIRE-BOX.—An English firm, Messrs. Partington & Co., of Bradford, are putting on the market a step cone fire-box, with the object of securing strength and firmness from the steps of each cone, and a form which makes studding unnecessary and facilitates examination and cleaning. It is claimed also that the flanged-stepped cones present a greater

amount of impinging surface to the action of flame, and thus increase the efficiency of the heating surface, while the increased water space at the crown of the fire-box, gained by its conical form, is effective in preventing priming.

INDUSTRIAL TOWNS on the plan of Pullman, near Chicago, seem to be getting popular. A few weeks ago the announcement was made that Jay Gould proposes to found such a town near St. Louis. Now it is said that the Atchison, Topeka & Santa Fe Railroad Company will build another Pullman about 11 miles west of Kansas City. Large manufacturing establishments will be located there, surrounding which will be a miniature city with all the conveniences and advantages of modern life. Another scheme of the same sort is reported to be under way near Lincoln, Neb., promoted by the Chicago, Burlington & Northern Railway Company.

If there is one thing of which American manufacturers may justly feel proud it is their reputation for furnishing what they contract to furnish, both as to material and workmanship. With no intention to boast of this, the helahorings which English technical journals are giving manufacturers for their shortcomings may well lead us to a little pride in the matter. Chains, we are told, are made in England with an occasional link only of good iron; articles of hardware are sent abroad which are so abominably bad that trade is ruined thereby; textile fabrics are about as bad as had can be, and so on through this list. We should be sorry to give English manufacturers so poor a character as they get from their own technical press.—*American Machinist*.

FLOAT TIMBER AND DRY ROT.—It has been ascertained that timber which has been floated in water for a considerable time is no longer liable to the attack of dry rot. The alumen and salts are slowly dissolved out, thus depriving the fungus of the nutriment needful for its development. A French experimenter has shown that fresh sawdust rots away in a few years in damp earth, whereas sawdust from which the soluble matters have been soaked by water remains unchanged under like circumstances.

THE FASTEST TORPEDO-BOAT.—A torpedo-boat for the Chinese navy, built by Messrs. Yarrow & Co., had her official trial, when she attained the remarkable speed of nearly 24 knots per hour as a mean of six runs over the measured mile in the Lower Hope—three with and three against the tide. To be exact, the speed was 23.582 knots, and a subsequent run of two hours' duration gave a mean speed of 22.94 knots, with the engine running easy. The boat had on board her torpedo armament complete.

VALUE OF DIFFERENT PIG IRONS.—It is well known among old pig iron users that charcoal iron is first in purity, firmness of grain and tenacity, while anthracite iron comes next, coke irons next and bituminous next. There used to be a great deal of Scotch pig used, but the proportion is steadily diminishing, as it is the poorest iron coming into this market, and founders have discovered that several American irons, costing a great deal less, furnish a greater amount of castings.

THE DECAPOD LOCOMOTIVES.—The Decapod locomotives built last year by the Baldwin Locomotive Works for the Northern Pacific Railroad, are now at work in construction on the Cascade mountain division. The engines have been a surprise to the mechanical department of the road, owing to the unexpected ease with which they pass round the sharpest curves. They will go anywhere that an eight-wheel engine can go.—*American Machinist*.

A BELGIAN glass-blower at Meadville, Pa., accomplished the feat of driving a locomotive and train of cars with gas manufactured from crude oil. The device, which occupies a small space on the tender and is connected with the furnace, is very simple. The experiment has been pronounced by competent persons a complete success.

A GUN larger even than any of the monsters hitherto produced is now under construction by Krupp. It is 52½ feet long and weighs 315,000 pounds, although only 15½ inches in bore. Its lightest projectiles will weigh 1632 pounds, and will be propelled by 1070 pounds of prismatic brown powder.

HEATING CARS BY STEAM.—The Pennsylvania Railroad Company gives out that its experiments in heating cars by steam have been so successful as to authorize a definite announcement that the car stove will be banished from its passenger trains so soon as the requisite changes can be made.

PRESIDENT HOWELL, of the East River bridge, proposes to meet the demands for increased accommodation on that thoroughfare by utilizing the driveway as cable roads, thus permitting 14 four-car trains carrying from 30,000 to 35,000 passengers every hour.

THE output of the locomotive works of this country at present is estimated to number nearly 40 engines per week.

SCIENTIFIC PROGRESS.

Hard Water.

As the hardness of water is a matter which occasionally comes up for investigation by mechanical engineers, the following remarks by a correspondent of *The English Mechanic*, Mr. H. J. Hardy, F. C. S., will prove interesting. We quote: The hardness of water consists of two kinds—temporary and permanent. Permanent hardness is that which cannot be removed by boiling. To determine the total hardness proceed as follows: Take 50 c. cm. of the water, place in a stoppered bottle of about 10 ounces capacity, and run in standard soap solution until, after well shaking, allowing the bottle to lie at rest on its side for four or five minutes, the lather does not break up—or, in other words, until a permanent lather is obtained. Sometimes a false permanent lather appears, but by always adding another cubic centimeter of soap solution, when the process is thought to be finished, this error may be obviated, as the lather will at once commence to break up if it is not permanent. Should the water be a magnesium water, the entire solution must be so regulated that only about 8 c. cm. of this soap solution is used. If 50 c. cm. of the sample takes more than 10 c. cm. soap solution, dilute 50 c. cm. of the sample with 50 c. cm. of distilled water and work in half, doubling of course the number of cubic centimeters of soap solution used. For every 50 c. cm. of water used, whether sample or distilled water (for dilution) 1 c. cm. must be deducted for absorption. Magnesia may be estimated by precipitating the lime and applying the soap test to filtrate. Multiply result by 42.75, and it will give grains of magnesia per gallon. The permanent hardness may be estimated by taking about 0.5 liter, placing in a flask connected with an inverted condenser, and boiling for an hour. The water is then filtered from deposit, 50 c. cm. of the filtrate taken, and the soap test applied as before. This gives permanent hardness. This total hardness, less the permanent hardness, gives temporary hardness.

Car Lighting by Electricity.

The regular Boston "special," on the Boston & Albany Railroad, was, last week, lighted by electricity and heated by steam—an arrangement which adds much to the comfort of passengers and removes altogether the danger from fire, always imminent in trains lighted and heated in the old way. The use of incandescence lighting on railway trains is not novel, nor is steam for heating. The Pennsylvania and other railroads long ago used this system of lighting on some of their special trains, and steam has been used for heating cars and other conveyances for years. But, up to the present time, no system of electrically lighting trains has proved satisfactory from a practical standpoint, and if that now adopted on the Boston "special" fulfills its promise, a really important advance will have been made in applied science.

In the system in use, electrical accumulators, commonly called "storage" batteries, are placed under the cars, and these having previously been charged from a dynamo-electric machine, while the train was lying in the depot, give out electrical energy as required. In this particular case, there are 60 cells to each car, and these, it is said, are good for this round trip between Boston and New York, thus necessitating the maintenance of only one electrical station.

In every car there are 20 incandescence lamps, each of 16-candle power, thus being equal in intensity to a five-foot gas-burner. As these lights glow in a vacuum without combustion, there is no danger of their setting anything afire in case of accident. Indeed, the entrance of oxygen, through the breaking of a globe, puts an instant end to the life of the lamp.—*Scientific American*.

ALUMINUM BRONZE.—The melting point of aluminum bronze varies slightly with the amount of aluminum contained, the higher grades melting at a somewhat lower grade. The "A" grade melts at about 1700 degrees F., a little higher than ordinary bronzes or brass. Aluminum bronze shrinks about twice as much as brass, and hence due allowance has to be made for this in the mold and pattern. As the metal solidifies rapidly, it is necessary to pour it quickly and to make the gates amply large, so that there will be no "freezing" in the "gates" before the casting is properly fed. To obviate the shrinkage as much as possible, the metal is allowed to enter the mold at a temperature no higher than will admit of its running freely. Where there is a heavy mass of metal in the shape of an envelope surrounding a core, the contraction upon solidification will cause the metal to split unless the core is made to yield equally with the contraction. Baked sand molds are preferable to green sand, except for small castings.

ELECTRICITY FOR FARMING PURPOSES.—In a paper read by Mr. Rix, of London Colney, St. Albans, on "Harvesting," before the London Farmer's Club, says *Iron*, an interesting account was given by the lecturer of the employment of electricity as a motive power on the Hatfield estate, belonging to the Marquis of Salisbury. It appears that electricity is used at Hatfield for

many purposes, the elevators for building the hay and cornstacks being worked by its means. Arrangements have also been made to thrash by electricity. The power is obtained from a water-wheel in a central position, and carried by wires wherever it is required. Mr. Shillitoe, the resident engineer at Hatfield, supplies some details. He states: "We are using electrical power for pumping sewage for the purpose of irrigating the higher lands. This is most useful, as the power obtained from the river running through this estate can be had for nothing. We not only use the power for thrashing and for working the elevators, but we employ it at a much greater distance from the river—1½ miles—for cutting the rough grasses into chaff for ensilage, which has proved a great success. The same power is also used at a farmstead, half a mile from the river, for grinding all the barley, maize, etc., for cattle feeding." It thus seems that there is no limit to the use of cheap electric power wherever work is required to be done, thanks to water-power.

A LARGE BALLOON.—A captive balloon is proposed by M. G. Yon for the French Centennial Exhibition in 1889, which will have the enormous capacity of 60,000 cubic meters (2,119,000 cubic feet). The greatest altitude proposed to be reached in the ascensions will be 1000 meters (3280 feet), and it will be possible to take 100 passengers, a winding engine of 600-horse power being employed. In the construction of this balloon, the following point is of some interest—a principle of construction which, if we remember rightly, has been applied in a previous balloon. As the surface of the balloon must always be tight, in order to prevent the damage which otherwise a strong wind might cause, and to preserve this tightness, notwithstanding variations in temperature, another small balloon is placed inside the large one, and the volume of this small balloon, which is filled with atmospheric air, can be increased or diminished by pumping in or exhausting air by means of an air pump, worked by an electric motor on the car, the current for this motor being supplied by a twin cable from a dynamo on the ground.

HEATING TRAINS.—It is generally considered that the methods used in Europe for heating trains are far inferior to those employed here. The footwarmers generally employed in England and France are certainly very inefficient during a hard frost, and though very safe, not only hardly keep the passenger's feet warm, but entail a great deal of labor on the railroad staff at stations, as they have to be changed every two or three hours. A totally new system has been introduced on the Caledonian railway by Mr. D. Drummond, the superintendent of motive power, and has been used with great success on through trains running between Glasgow and Aberdeen during the last two years. It is claimed that the cars have been kept steadily at 62 degrees, which is considered a very satisfactory result, as in Great Britain dwelling houses are never kept at the high temperature usual here. Exhaust steam from the engine is used, the condensed water being allowed to escape under each car. When the engine is first attached to the train, live steam is turned on and the train is soon heated to a comfortable temperature.—*Railroad Gazette*.

A NEW USE OF NATURAL GAS.—Natural gas has been put to a new use at Sewickley, near Pittsburgh, Pennsylvania. According to report, around natural gas posts, within a radius of 20 feet, grass has been as green all the winter as in summer. For more than a month, pansies planted near these posts have been in full bloom. Taking advantage of this influence of natural gas, a market gardener is raising asparagus in the open air by the aid of the gas, and proposes to test its use in beds of vegetables heretofore grown in greenhouses.

NEW MODE OF PREPARING OXYGEN.—Into a suitable generating apparatus introduce two parts of commercial solution of peroxide of hydrogen (3 per cent) and a pound of dilute sulphuric acid (1.5). Into this mixture allow to enter gradually through a safety funnel a solution of 800 grains of potassium permanganate in 28 fluid ounces of water. Oxygen will be rapidly disengaged without application of heat, the yield from the above quantity of materials being five gallons.—*Bulletin de Pharm. de Lyon, Arch. de Pharm.*

A NEARLY PERFECT SIMPLE PENDULUM.—Mr. J. T. Bottomley, of the University of Glasgow, suspends a small shot of about 1.16 of an inch in diameter, by a single silk fiber (half a cocoon fiber) two feet long, in a glass tube three-quarters of an inch in internal diameter and exhausts the latter to about one-tenth of a millionth of an atmosphere. Starting with a vibrational range of one-fourth inch on each side of its middle portion, the vibrations can be easily counted after a lapse of 14 hours.—*Phil. Mag.*

METAL SCARFS AND NECKTIES are a new German invention. Gold, platinum and silver strips are welded, after the mosaic style, upon a metal ground, prepared by the incandescent process, then compressed by means of powerful presses, and finally elongated by rolling into long sheets or strips. The colors are yellow, red, green, white, gray and black, and the scarfs, being indestructible, are considered of practical value. They are manufactured chiefly at Baden and Pforzheim.

ENGINEERING NOTES.

Progress in the Art of Tunneling.

A French writer directs attention to the constant progress made of late years in tunneling and drifting through rock. Along with the improvements in rock-drills have come no less marked improvements in explosives. The results have shown themselves in a constant increase in the rate of advance in the daily amount of work performed. Thus in the Mont Cenis tunnel the average daily rate of progress was only 1.75 meters a day. In the St. Gothard tunnel, where more powerful explosives were used, the rate was 2.75 meters. In the Arlberg tunnel still further improvements in drills and explosives were used, with a better organization for work, and the rate of daily progress advanced to 4.15 meters. More recently the Levant tunnel was driven at the rate of 4.50 meters. And in the last great work of the kind, the Carrizo tunnel in Italy, where blasting-gelatin was used in deeper holes than those in which dynamite could work effectively, the average daily advance was 5.40 meters. Some allowance must, of course, be made in these estimates, for difference in the character of the rock encountered and other conditions of the problem; but as these averages are for the whole work, they represent approximately the progress made in the science and practice of mining since the completion of the Mont Cenis tunnel.

The Crnton Aqueduct Tunnel.

The work of driving this tunnel has awakened such earnest rivalry between the leading makers of drilling machinery, and the contractors and the men are so thoroughly imbued with the spirit of emulation which this rivalry has excited, that the work is progressing with unprecedented rapidity. When it is completed, the record of this tunneling done upon it will undoubtedly exhibit the most rapid and effective work of this kind that has ever before been accomplished, and will be highly creditable to our manufacturers of tunneling machinery, evincing, as it will, that the efficiency of this class of machines has been brought to a higher state in the United States than elsewhere.

THE INDO-EUROPEAN CANAL by way of the Euphrates valley and the Persian gulf, is still a matter of serious consideration, and will, no doubt, ere long become a necessity to the commerce of the world, as the Suez canal will soon be absolutely unable to meet the demands upon it. The project is a canal with a double aim, a canal of irrigation and of navigation. In this way it is proposed to restore fertility to these wastelands. The plan is to create a river from Soudieh to the Persian gulf by making the Euphrates flow to the Mediterranean by Aleppo and Antioch; from Beles, in deepening the river from Beles to Fendjah (near ancient Babylon); in passing from the Euphrates to the Tigris by the canal of Saklavijah; and lastly, in descending the Tigris from Bagdad to Kornab, Bassora, and Fao on the Gulf. The new canal would shorten the present route of going and coming to Bombay by six days. M. Eude, the chief promoter and engineer, does not consider the engineering difficulties of a serious kind—nothing which would seriously resist modern appliances. This was in ancient times the great route of commerce, before the founding and development of Alexandria diverted it on Suez and led to the Suez canal. The estimate of the total cost of the works do not exceed a milliard of francs, and the maximum capital required would be 1,500,000,000 francs.

THE TRANS-CASPIAN RAILWAY.—Naphtha is the fuel used for working this line. Prof. Vamhry has furnished the *Fortnightly Review* a very interesting description of this distant railway. After describing the manner in which the new fuel is used, he says: "In a country where there are no roads, where no fences, no gates and no watch-boxes are required, it was quite sufficient to place a watchman's hut every 12½ versts. Such a hut is built in the form of a barrack, and serves as the dwelling place of several workmen and watchmen. By its side is erected a small tower, from which the road can be surveyed for some distance right and left. But in order to inspect more minutely the state of the permanent way, to try the rails and to remove obstacles, two men start daily from the barracks, going six versts in each direction up and down the line. For this purpose each barrack is provided with two horses. On their journey out one rides and the other walks; on their return journey the one who rode walks, yielding the horse to his comrade, who now in his turn rides. By this clever arrangement, the inspection of the vast line of railway does not require more than 110 or 120 such guard-houses, and a by no means contemptible economy is effected.

A RUSSIAN SHIP CANAL.—Some attention has been directed in Russia to a project for a second connection between the Sea of Azof and the Black sea by a canal through the isthmus of Perekop, which connects the Crimea with the mainland. As now outlined it is proposed to build a canal 12 feet deep and 65 feet wide through the isthmus, with ports at each end. The object of the canal is to avoid the dangerous navigation of the Straits of Kertch,

GOOD HEALTH.

The Cancer Discussion.

EDITORS PRESS:—Having spent several years of my early professional life in a cancer ward of one of the largest hospitals of Europe, I am very naturally interested in the one-sided discussion of cancer now going on in your paper, which has accidentally fallen under my observation during my brief stay in your city.

My experience in the treatment of this disease had led me to the belief that no treatment had yet been found whereby the well-defined cancer, after a certain stage of development, could possibly be made to yield to the skill of the medical practitioner.

Like every physician of experience in the treatment of cancer, I had secretly admitted the force of the declaration of a certain distinguished physiologist of the last century, who said: "There are yet some diseases which medical skill hath not encompassed, and must therefore be placed among the incurables." This admission, of course, was not for my profession, but for myself, when left alone, in moments of secret thought. What other conclusion could a candid mind reach when cognizant of the universal failure to cure, which marks the history of this treatment at every step, whether it be in hospital or in private practice, both in Europe and America? In the Middlesex hospital of England alone, they have in the cancer ward 310 beds, with an annual average number of in-patients of 2700 and of out-patients of over 30,000. This proportion, all things equal, is the same in all the hospitals of the continent, and yet the entire medical fraternity is halled in a successful treatment of this disease. To stand at the doors of the hospital wards and witness the immense throngs of unfortunates who pass in, and the very few who pass out as cured, is to witness one of the saddest phases of human misfortune. Here it is more than at any other post of duty that the physician feels his ignorance and his professional hypocrisy in assuming to cure with the surgical knife. Here it is, if ever, that he bows to science and asks with fervent emotion for a new pathological revelation, for some substitute for the butcheries of the surgeon. Of course, the knife is the only accepted remedial agent at present throughout the world.

In some incipient cases it proves a success. And then again, the question arises here, whether the diagnosis after all in such cases may not be erroneous, knowing as we do the character of the scirrhus tumor? With my experience and observation, then, it is not strange that I should feel no small degree of interest in the assumed discovery here in this city of a veritable cure for this formidable disease. My surprise is, however, that the medical faculty of San Francisco do not investigate and ascertain the merits of this alleged discovery, particularly when so many evidences of truth exist in their very midst. I well understand the proverbial disinclination of physicians to depart from orthodox dogmas, and particularly the common disinclination of men to adopt the views of the so-called weaker sex, especially in matters of intellectual or scientific research.

But inasmuch as pathological knowledge still remains to a great extent in the domain of the experimental, it is due to themselves, as representatives of a noble calling and as ministers of benevolence to the race, that they calmly and considerately examine, without prejudice or jealousy, the alleged discovery in question. Because the successful treatment of cancer has thus far baffled the skill of the ablest practitioners of these and all former times, it does not follow that a specific has not now been discovered.

The eighteenth and nineteenth centuries are brilliant with discoveries involving the amelioration and the progress of man which put to shame the grandest achievements of the best intellect of all the former periods of our history. And because a woman is the discoverer of this alleged panacea, it does not follow that it is not a discovery which is destined to prominently stand out in the history of pathological triumphs. Looking over the intellectual and scientific fields of woman's labor, the candid mind must frankly admit that it is not alone for man that Genius has woven or twined all her chaplets and crowns. From the manger sprang the only moral philosophy that bears the seal of God.

From the ranks of the million have come some of the mightiest embodiments of inspired thought.

From the unwashed multitude are constantly stepping to the front those to whom the diplomas of the schools would add no luster. Sheepskins and oils are of human creation and are pleasing confirmation of personal merit. But neither Moses, David, Plato, nor Paul, Shakespeare, Sheridan, Herschel, nor Watt, Cromwell, Cullen, Davy, nor Burns, Washington, Lincoln, Clay, nor Grant, were ever honored with any certificate of merit from either priest, prelate or college president. Hence the claims of every disciple of science should meet with respectful consideration on the part of the conventionally anointed; for savans and Meselars are necessities in the great order of evolution, and may be looked for at any hour of the grand march and at points when least expected.

Therefore, neither dogma nor jealousy should separate or estrange the different schools of medical practice; especially for the sake of science and humanity, Allopath should shake

hands with Eclectic across "the bloody chasm," and so on down the full line of the schools. Truth often drops her pearls where dogma and arrogance little dream.

The pride of Judas saw no good that should come out of Nazareth. Socratic philosophy as embodied 2300 years ago would fall flat on the ears of Cambridge and of Oxford to-day. Had not Lincoln been led by a discerning and almighty Power over diplomats, sheepskins, and anointing vessels, the grandest character of American history would have been lost to the world. In conclusion, I will remark that acting in accordance with my faith, I have spent a portion of my brief visit to your city in investigating the discovery in question.

I do not regret it. I have done it profitably. I have caught a glimpse of a light which I hope may finally burst into a vast and luminous orb. I am satisfied that the assumption of a great discovery in the treatment of cancer has the appearance of being well founded. I have seen what cannot be seen in any part of Europe or America. I believe it to be a triumph for humanity and science. In its presence I stand again in the cancer wards of the Old World, holding in my hand a promise of hope to the hopeless. The medical faculty of the Pacific Coast should at once give it countenance and a respectful hearing. To reject it is to betray a dogmatism, a jealousy and a disloyalty to science and humanity that borders on criminality.

MEXICO ON THE WING.

LIME-WATER AND ITS USES.—Lime-water, when applied to suppurating or mucous surfaces, checks or stops secretion and produces dryness of the parts; hence it is a desiccant, and is useful in sickness and irritability of the stomach during teething. The power of exciting and changing the mode of action of the absorbent vessels and glands has been ascribed to lime-water, and probably with some foundation, for under its use glandular enlargements have become softer and smaller—in other words, it is resolute. It often relieves the superficial but painless ulceration of the mucous membrane of the mouth observed in dyspepsia. In these cases one part of lime-water to two or three of milk is usually sufficient. Given in this form, it will often stop the most violent sickness. In some scrofulous ulcers its power of checking secretion is most marked.

HONEY CURE FOR CHOLERA.—C. E. Willis contributes the following to the *Santa Barbara Press*: Dr. George Sowers, practicing physician in Socorro, has used pure honey as a specific for cholera for two years past, and has not lost a single case. He has had a large number of cases under his care, whole families being often attacked, and gives them honey, first, last and all the time and nothing else, for food or medicine. It is distasteful to the cholera patient, but is good medicine all the same. John A. Helphingstine, at present Superintendent of the Coronado Beach Company, San Diego, was long a resident of New Mexico, and reports that he has witnessed the wonderful success of this simple remedy.

HOW TO TREAT THE FAINT.—Old Dr. Gittings, of Columbia, S. C., being called to a lady who had fainted, found the patient stretched upon a sofa, with a high pillow under her head. The doctor's first instructions were: "Take that pillow from under her head and place the family Bible under her heels, and she will be all right in a minute." One who heard him say it has never forgotten this remedy, and has practiced it repeatedly with great success. Fainting is occasioned by lack of blood in the brain. When the sufferer is placed in the position described above, the blood flows back into the brain and the fainting fit is over.

USEFUL INFORMATION.

Important to Architects.

A question is asked in *La Semaine des Constructeurs* which is not infrequently heard in this country, and the French opinion on the subject is of interest to all architects. It seems that a proprietor invited estimates from a number of contractors for the execution of a monument, after plans and specifications prepared by his architect. The work was not carried out, and one of the contractors sent to the proprietor a demand for payment for his trouble in making the estimate. The correspondent inquires whether he is entitled to receive such payment. To this the editor of *La Semaine* replies, that the fact of the submission of plans by a proprietor to a contractor, and an inquiry as to the sum for which he will carry them into execution, does not legally imply any engagement of that proprietor with the contractor. The process is simply an ordinary consequence of the custom of competitive bidding. The contractor knows the risk, as well as the advantage, of responding to the invitation to submit an estimate, and he is free to do so or not as he chooses. If he chooses to make a tender, he can only do so intelligently by studying the plans, and this he does for the sake of making the offer, and not as a favor to the proprietor.

Another question of some importance is also answered in *La Semaine des Constructeurs*. It appears that a certain church was in process of construction or repair, under the direction of an architect who had made proper calculations, and had taken the necessary means for insuring the stability of the edifice after its comple-

tion. During the progress of the work certain centers, placed to support the arches temporarily, failed, and the building was injured. The point to be determined is, whether the architect or the builder should be held responsible for the accident. The reply to this is, that as a general principle, the contractor is alone responsible for defects in execution, and the architect for vices in the design. The contractor is supposed to know, better than the architect, the order in which the several portions of a construction should be carried out; he is expected to understand the modes of preventing injury or failure in unfinished work; he is constantly present, in person or by deputy, to direct the operations in progress, and is relied upon to watch effects and supply remedies. The architect, on the contrary, so far as regards his plans, is concerned only with the finished work, and if that is designed in accordance with the laws of stable equilibrium, his duty in relation to the plans is fulfilled. If, being present at the work, he should give wrong directions, he would have at least a share of the responsibility to bear, but in his absence the contractor is certainly bound to pursue his operations in accordance with the rules of his own art. For these reasons *La Semaine* decides that the contractor alone should be held responsible for the dam-knots, burls and other marks usually found on branches of trees. One in particular, representing a branch cut off close to the main limb, is very effective. With these screws, our man will take a little table or a chair and make a rustic concern of it in ten minutes. The device is not patented, and the man who gets the idea worked down into practice by the wholesale stands a chance of making a good thing.

FOOD ADULTERATIONS.—The chemists of the Agricultural Department, under direction of the Commissioner, have for a year been investigating the extent and manner of food adulteration practiced in this country. The report relating to spices and condiments is already completed by Mr. Clifford Richardson. It shows that of 20 samples of ground cloves only two were pure; of eight samples of cayenne pepper only one was pure; and of ten samples of mustard none were pure, though several had only suffered the loss of their fixed oil. Ten samples of allspice were examined, eight of which were pure. Four samples of cassia were all pure. Of ten samples of ginger four were pure. Only one out of 13 samples of black pepper was found to be what it purported to be. Two samples of white pepper out of five were pure, two samples of mace out of five were pure, and of three samples of nutmeg examined all were pure.

THE PANAMA CANAL.—An ex-official on the Panama railroad who recently returned to New York, states that it is almost impossible to describe the waste and extravagance which are going on along the canal. Engines, dredgers, excavators and everything of that sort, lie along the line of the canal very much as bones used to line the old wagon trail across the prairie. It looks like a woeful miscalculation to order machinery which cannot be used, and then let it rust in the rain and sun. The whole enterprise is covered over with red tape, and, in the midst of all the circumlocution, the money is lost by the thousands. There are first, second and third chiefs to each division, and they have a lot of assistants, so that when anything is wanted the order has to be checked and counter-checked by a dozen officials who draw big salaries and do nothing.

SUMMING UP the results of some 3000 special reports on industrial matters, *Bradstreet's* concludes that, in the region covered by these reports, about 27 per cent more hands were at work March, 1887, than in January, 1885. This study is confined to "industrial, mechanical and mining employes." The increase of wages in the same time has been 10 to 15 per cent, which seems to be just about the same as the reduction from 1882 to 1885.

SOFT SOAP with half its weight in pearlash, one ounce of mixture in about one gallon of boiling water, is in every-day use in most engineers' shops in the drip pans used for turning articles bright in wrought iron and steel. The work, though constantly moist, does not rust, and bright nuts are immersed in it for days, till wanted, and retain their polish.

THE Secretary of the Navy, Washington, D. C., has invited proposals from American ship-builders for building the Newark, a 4000-ton cruiser, cruisers Nos. 4 and 5, and gunboats Nos. 3 and 4. All of their parts are required to be of domestic manufacture, and the contractor is required to guarantee a maximum speed of 19 knots an hour.

SIMPLE TEST FOR GOLD.—Take a piece of flint and rub against it the metallic object to be tested, until the latter leaves a sufficiently marked trace upon the stone. Upon bringing the flame of a sulphur match in contact with the spot, the latter will remain intact if it has been made with gold, but will disappear if the contrary be the case.—*La Science en Famille*.

COTTON-SEED AND CACTUS FOR BEEF.—It is said that a trainload of 330 cattle, from Cotulla, Texas, which had been fattened on prickly pear and cottonseed meal, was lately marketed in Chicago. They attracted considerable attention, being the first large lot of cattle ever fed that way for market, and were sold at \$4.25 per cwt.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

NEW LONDON.—Amador *Ledger*, April 30: A fine body of ore has been struck in the shaft of the New London, near Plymouth, at the depth of 950 feet. The ledge is over three feet wide, of blue ribbon rock, showing free gold, and carrying a heavy percentage of rich sulphurets. The principal owners are up from S. F., and are highly pleased.

MISCELLANEOUS.—Noah Bowman and F. M. Pense have struck a rich claim about 300 yards from Mace's mill. They have taken out several pockets. The ore is sprinkled with gold. The Plymouth Con. Mining Company of California will pay, May 5th, their forty-eighth dividend of 25 cents a share, or \$25,000, making \$125,000 paid this year, or \$1,950,000 paid to date. At the Kennedy, some extraordinarily rich ore was taken out last week. It was so freely charged with free gold that it was put in sacks and sent to the surface. Some five or six sacks were taken from the pocket. Jake Griesbach has sold his mine in Pioneer district to a party from S. F. The price paid is given at \$7000. The parties are talking of having the ore on the dump hauled to Pine Grove and crushed at the Dane mill. The test crushing of ore from the claim of Spagnoli Bros., near Clinton, was completed last week, and averaged \$12.11 per ton. S. D. R. Stewart has purchased the Summit mine, south of the old Eureka at Sutter creek. He intends to start work thereon as soon as he can make the necessary arrangements. There is a shaft 700 feet deep on the property, and this he intends to drain and sink deeper. A large Huntington roller quartz-mill has been shipped for the McKenzie Bros. to be erected on their mine near Irishtown, about six miles above here. Further particulars about the strike in the New London state that the ledge is from seven to eight feet wide, and contains a small seam of free gold-bearing rock that will yield at the rate of several thousand dollars to the ton. In the opinion of many it is thought to be the richest body of ore that has been struck in the county for years. It is the intention of the owners to put down another shaft, and also to erect a 40-stamp mill, which may be kept running while the second shaft is being sunk.

DRYTOWN.—Cor. Amador *Sentinel*, April 29: The claim of Ebe and Shoemaker, also that of M. Jorganson, on Dry creek, are on the same lead. Both claims have tunnels run to the depth of 400 feet. Mr. Jorganson intends to erect water-power hoisting works and sink a shaft during the summer. The Cosmopolitan, lately sold by Jennings and Nute to an Eastern company of which ex-Governor Hale, of New Hampshire, is the principal owner, have but two men at work at present running a tunnel; in doing so they have come across some old work done by Wm. Hooper in '54. The company intends to erect, during the coming summer, very extensive works. The old Potosi, which has been lying idle so long, has been bonded by Carrara and Mayden, who are crushing some very rich rock taken from a tunnel lately run by them just east of the old shaft. M. C. Randolph is trying to form a company to take hold of his claim, the Olive. The mill is not running now, owing to lack of machinery for keeping water out. The Loyal or Black Hills and the Gover still continue to pound out the gold.

Butte.

UNEXPLORED GOLD FIELDS.—Oroville *Mercury*, April 27: The *Mercury* has always contended that quartz and drift mining in Butte has never even been prospected. Evidences are constantly coming in of the truthfulness of this position. Through the hills around Enterprise, Mooretown, and Forbestown there are veins of quartz which certainly contain large quantities of gold. Whenever one of those ledges has been followed any distance, gold in fine paying quantities has been found. The same is true of the ridge from Bidwell's Bar to Quincy, and from Oroville to Big Meadows by way of Magalia, Inskip, Butte creek, and Humboldt valley. If there isn't in the near future a grand era in gold mining in Butte, we are badly mistaken.

Calaveras.

COPPERPOLIS.—Cor. County *Record*, April 27: Col. H. D. Ranlett has been here with D. L. Merrill, of Mokelumne Hill, to make an approximate measurement of the amount of water to be pumped out of the Union mine. This is to be done by a measurement of the vast amount of rock and debris found outside, to learn the displacement. The owners of this mine reside in Boston, and the proposed sale is to parties in England, recently visited by Col. Ranlett, and who say they can't purchase without seeing the mine, and that involves the cost and time of clearing it of water. The old pumps are not fit for use, so it is proposed to hoist it out with large buckets. A detailed report has to be made to the company as soon as possible of the *modus operandi*, a close estimate of the cost, and the length of time it will consume to accomplish the work. Then the company will decide whether to go ahead or drop the subject. The mine is 500 feet deep, divided into levels, with quantities of full grade ore yet unworked. Immense quantities of this copper ore were taken out and shipped to Stockton, in wagons, during the late civil war, at which time copper was worth from 40 to 45 cents a pound; it is worth now about 10 cents.

MURPHEYS.—Cor. Calaveras *Prospect*, April 29: Mining is still the main stay of our industries, and now that there is something more than chemical experts and broke pauper alloy capitalists coming among us we can reasonably expect that something may be done in the way of developments. Good mining men representing sufficient capital to develop a mine and perseverance to determine whether they have a mine or not, are daily coming among us. A group of three mines near here it is said have been sold to a San Francisco party, who will proceed to work at once. And still another party will be here in a few days to look at another valuable property. Mining and mills are being worked and some with good results in this and adjoining districts.

El Dorado.

COUNTY NOTES.—Mountain *Democrat*, April 30: Mining in the vicinity of Latrobe is looking up, and

there are indications of a rapid advance in mining matters in that section. Thomas Davidson, who for some time past has been busily engaged upon his mine just west of El Dorado, was in town early this week, getting the last few odds and ends together preparatory to starting up his property in full blast. He intended starting up the mill on Wednesday last. There is already a large amount of ore on the dump, and more being taken out. Messrs. Neff, Church, and others, proprietors of the El Dorado claim, have during the week been on a visit to their property near El Dorado. They are more than pleased with the prospects. The company is now running drifts and prospecting the claim with a view to determining just where the permanent workings will be located. The present hoisting and pumping machinery will soon be replaced by heavier works now on the Baltic property at Grizzly flat. The activity in mining circles was added to this week by the purchase of the Kelley mine, in Kelsey, and we believe also an adjoining property, by Supt. Pierson, of the Gopher Boulder claim. He comes prepared to do extensive mining developments in this county. Before long a number of properties spoken for by his company will be put in operation which will materially increase mining activity in this county. Messrs. Skinner and Swansborough, who have been operating a gravel claim above Newtown, recently, in washing out gravel, unearthed a seam of quartz running through bedrock. They immediately began opening out the find, which proved to be a good wide lead of decomposed quartz, between well-defined walls, showing a handsome body of ore, which has panned out remarkably rich from the samples already crushed. They have opened out the lead for 30 feet, and find it equally good throughout.

NEW MILL.—Placerville *Observer*, May 3: Some of the principal owners of the El Dorado mine, consisting of W. T. Garrett, J. H. Neff, Gen. W. H. Brown, T. R. Church and Alex. Badlam, visited their mine for the purpose of witnessing the starting of their new 10-stamp mill. The company having several tons of good paying rock in the dump, the mill will be kept running continually, and a large force of men will soon be employed. The La Planta tunnel is being run rapidly, and the first roof will be completed in a few days. Thomas Davidson is running his mine north of town, with quite a force of men. The mill and concentrators have been put in order. Mr. Morgan, supt. of the Valanta mine, has gone below to purchase a larger pump to be used in that mine.

Fresno.

HILDRETH NEWS.—Fine *Gold Miner*, April 29: Hardly a week passes but that some lucky find is made; while prospecting underground continues to improve our reputation, as nothing yet in the shape of a setback has been encountered, but development invariably means improvement. This is notably the case in the Francis-James mine, which a short time ago was nothing better than a promising prospect, but now acknowledged to be one of the finest properties not only in this district, but in the State. The shaft is 235 feet deep, with levels running east and west every 100 feet. The ledge is four feet wide and the ore high grade, with galena sulphurets to the amount of from two and one-half to three per cent. The Hildreth shaft is to be sunk 200 feet deeper in order to open up more stopping ground. Work in this mine has progressed very favorably and its value established. It is estimated that 450 tons of \$60 ore are now on the dump ready to be crushed, and the company is putting up concentrators and repairing the mill to put this ore through. The Abbey continues its steady work and regular hulsion shipments, and everything in the vicinity wears a prosperous appearance. A fine body of ore has been encountered in their northeast second and third levels. The condition of the Dahlonega mine is very flattering. This property is located in Fresno mining district, about three miles west of Hildreth, and is owned by Geo. W. Grayson, James R. Nicholson, O. D. M. Gaddis and Jack Morris, and is the extension of the much-talked-of Blue Streak mine that Haggin & Haywards own. The Dahlonega shaft is sunk on the ledge 100 feet with a four-foot vein in the dump, and lies in a contact formation containing very good ore and carrying about three per cent sulphurets. Robinson & Clark have put six tons of ore through their arrastra, and got a cleanup of \$240. The sulphurets, which are rich, were not saved. White Rock ore is now being hauled and crushed at the Abbey mill. The last rains exposed much ore containing free gold in the Mountain View ore dump. Many locations are being made in that vicinity. Mr. Wilson in a few days will start sinking the shaft, and employ seven or eight miners for that purpose upon his noted Wilson mine. The ledge is two and one-half feet between walls that contain two prospecting gouges.

Mono.

FROM SWEETWATER.—Bodie *Miner*, April 27: A. C. Raymond came in from Patterson district last evening in the interest of the Monte Cristo mine. He has purchased supplies, picks, shovels, and all that sort of thing. The first work to be done is to build a road from Cameron City to the mine in order to get in machinery for hoisting and milling purposes. The machinery is on the way, and this road must be completed in time to meet it. The building of this road is quite an undertaking in itself. Mr. Raymond started out a force of men to-day, and other bodies will follow to-morrow and hereafter.

BODIE.—*Miner*, May 2: Here at home we know that the Standard Con. is running 15 stamps and shipping bullion regularly. We also know that Captain John Kelly is again among us, and has been industrious in his group of mines all day. A revival of business in Bodie, anywhere in the near future, rests on what may be developed through the Lent shaft.

Nevada.

BANNER.—Nevada *Transcript*, April 28: Before the pay chute was lost, more than 20 years ago, the Banner mine produced in round figures over three-quarters of a million dollars worth of gold. Owing to the imperfect methods of working ores then, it is estimated that less than one-half of the royal metal in the ore was saved. After a period of idleness, work was resumed last fall on account of circumstances arising from the agitation of the Gold Bank tunnel scheme, and has ever since been steadily prosecuted. A short time since, splendid ore was opened on the 120-foot level, 75 feet north of the shaft, and picked samples of it assayed from

\$212 to \$380 a ton in gold, and in some instances as high as \$25 in silver to the ton. The ledge is from 20 to 22 inches thick, and the vein runs parallel to the old one. There is now between 10 and 12 tons of high-grade ore on the dump. This is regarded as a very important development. Work is being pushed steadily ahead at the Union mine, near the Banner. New hoisting apparatus has been recently put up. It is reported that some prospectors have recently struck a very rich stringer on the southeast corner of the Merrifield claim.

RICH ORE.—Nevada *Transcript*, May 1: O. Maltman has purchased from the lessees of the Banner mine 12 tons of ore, paying for it \$150 a ton on the dump. Some of the ore being taken out is estimated to be worth as high as \$300 a ton. They expect to get out 50 tons more of high-grade ore within a fortnight. Grading is being done at the mouth of the Champion tunnel for a mill. It will have a capacity of 20 stamps, but only ten will be put in at present. A shaft will also be sunk in the same locality, a good ledge being known to exist there.

Plumas.

GENESEE.—Cor. Greenville *Bulletin*, April 27: Affairs here in the mining line are somewhat on the boom. Ward creek promises to be lined with arrastras. There are three in active operation at present, and more in contemplation, with the prospects of the old Robertson mill waking the echoes in the upper part of the canyon, and the Genesee mill answering the same in the lower part. This latter is now working.

San Diego.

JULIAN DISTRICT.—Julian *Sentinel*, April 29: Mining operations in this district are now in full blast, and mines that have for years been running regular have increased their force, such as the Stonewall, Owens and Ready Relief. Many claims adjacent are being vigorously prospected, and work in taking out ore for crushing is going ahead, and the mining outlook was never brighter.

RED HILL.—The Red Hill mines, situated midway between Cuyamaca and Julian, have just been relocated by Mr. James Stratton and Governor Waterman, who have now commenced work on the claims sinking a shaft. These mines were formerly located by Mr. Stratton some four years ago, and at that time the ore being of a refractory nature, machinery could not be procured to work it satisfactorily, but being able to place the proper machinery on the ground, it is now thought a rich harvest is near at hand. Work will soon be resumed on the Richmond mine, between here and Banner, by the proprietors, Jas. Low and Thos. Lick.

Sierra.

SIERRA BUTTES.—Sierra *Tribune*, April 26: Forty-six miners have been discharged at the Sierra Buttes mine during the past week, but it is understood that their places will soon be filled again. A party of miners are about to begin operations in the Typhoon gravel claim near Alleghany. This mine was worked extensively in former years, and big pay was taken from it.

Shasta.

GOLD.—Shasta *Democrat*, March 27: Billy Conant brought down from the Uncle Sam mine another gold brick weighing 23½ pounds—the cleanup from a 12 days' run, crushing about 15 tons a day. Geo. McDaniels has a couple of fine prospects on Clear creek, about two miles northwest of Muletown. Another rich chute of ore was struck on the Uncle Sam mine last week, that surpasses in richness anything heretofore discovered on Squaw creek. The ore actually hangs together with threads of gold. The Shasta County Milling and Reduction Works, now being erected on the old Shasta road near the old Four-mile house, are rapidly assuming shape. This is a custom plant and will be of great convenience to miners.

LOST CONFIDENCE.—The most encouraging results are attained in milling the ore of the Lost Confidence mine at Iron mountain. Jas. Salle, the superintendent, is working the ore up to 93 per cent of the assay value, and the bullion is a little over 600 fine. The company is confident they can yet work the ore closer and produce finer bullion with improved apparatus they see is needed. Last week they shipped ten fine bricks to Denver, Colorado, and have over half a ton more bullion that will be shipped as soon as they get new and larger molds in which to run the bullion into larger bricks. This shipment of bullion tells the tale of the successful reduction of this base ore. The owners of the Lost Confidence believe they have enough money in Iron mountain to pay the National debt with.

PROSPECTING.—Shasta *Courier*, April 30: The amount of prospecting now going on in this county is astonishing, but much of it is superficial, merely surface scratching. Some parties knock off a chunk of quartz, and unless they see gold enough to make a watch-case, pass on.

MILL.—The Johnson Cannon Ball steam quartz-mill, a mile and a half north of Shasta, is running regularly and doing custom work on ore brought from mines near town. The results obtained show that the ledges about this place are good paying.

Trinity.

EASTMAN GULCH.—*Journal*, April 30: J. H. Fisher has completed the wagon road to his mine near Eastman gulch, intersecting with the Venecia Mine Co.'s road. The mill on the Venecia mine will be started up about the 15th of May.

Ventura.

NEWS FROM THE MINES.—Santa Maria *Times*, April 28: Mr. Ramie returned on Thursday last from the Piru mines. He says that beyond doubt the Piru mining district is very rich in gold and silver, that all the miners are jubilant over their prospect, especially Newton Nun, who has discovered and located a vein of quartz three feet in thickness, that is very rich in free gold. He reports very favorably on all the locations he visited, especially the Esperanza mine, owned by Capt. Harper and others of this place. He anticipates a regular mining excitement as soon as the weather and roads are favorable. Mr. R. reports many experienced miners coming in from Arizona and elsewhere, all of whom are well satisfied.

NEVADA.

Washoe District.

CON. CALIFORNIA AND VIRGINIA.—Enterprise, April 30: On the 1400 level, the west drift from the

main south drift still shows ore of fine quality. This body of ore is doubtless the upward extension of the development made last January in winze No. 1 then being sunk below the 1400, and which is now being stowed out. On the 1500 level from the south drift, 200 feet from the Con. Virginia shaft, an upraise has been started. At a point 600 feet from the shaft two crosscuts have been started from the south drift; one, a west crosscut, is designated as No. 2, and the other as east crosscut No. 3. The first has been advanced a total distance of 43 feet, and the second a distance of 61 feet. The south drift from the Ophir 1065 level, which entered the Con. California and Virginia mine on its 1200 level, has now been advanced 62 feet in Con. California and Virginia ground. The usual shipments of ore have been sent to the Morgan and Eureka mills, and the average assay of battery samples will be fully up to that of last week.

SAVAGE.—On the 600 level the upraise in the ore body is now advanced 76 feet above the sill floor of the level, and the ore chute is completed up to the tenth floor. The winze in the ore body has been sunk 45 feet in fair ore, and is now 75 feet below the sill floor of this level. On the 800 level, No. 1 west crosscut from the south drift has been extended 45 feet in the quartz body. At this point they have put in four square sets preparatory to upraising in the quartz body. No. 1 east crosscut on this level (800) has been advanced 69 feet. They struck a flow of fully three inches of water in the face of this drift on Friday of last week.

IOWA.—All the work during past week in east and west vein and boulder drift has been in good gold-bearing rock. Grading for a mill has been started and will be pushed. All the machinery is expected here first of next week and mill will be in operation by the middle of May. A new tunnel has been started on level of mill through which the ore will be delivered at mill.

HALE AND NORCROSS.—Since last report the south drift on the 1300 level has been advanced 92 feet, where connection was made with the Chollar mine. At this point they have excavated and finished a large working station for that company, and have repaired and equipped the incline for a distance of 100 feet above this level.

OCCIDENTAL.—On the 90 level, in the lower tunnel, the north drift from No. 2 upraise was extended 15 feet; total length, 197 feet. East crosscut No. 3, 50 feet north of No. 2, was advanced 10 feet; total length, 23 feet. No. 2 west crosscut was advanced eight feet. All of these openings are in quartz of low value.

BALTIMORE.—On the 400 level good headway is making in cleaning out and repairing the old drifts. On this level there is much new ground that will soon be explored. On the 300 level an upraise will soon be started in the vein to tap the old 225 level. The drift on the 500 level has now about drained out.

CROWN POINT.—There has been some difficulty in regard to obtaining milling facilities, and meantime about 30 miners have been laid off. These, however, will be put to work again in a day or two at the extraction of ore. Meantime much ore is being opened out and put in shape for being taken out.

BEST AND BELCHER.—On the 1500 level east crosscut No. 1 was advanced 80 feet; total length, 590 feet. No. 2 was advanced 90 feet; total length, 554 feet. These crosscuts are in softer porphyry, showing clay. In No. 1 there is a little warm water flowing from the face.

MEXICAN AND UNION CON.—On the 1300 level the joint Union and Mexican drift running northeasterly was extended 22 feet. This drift is now 498 feet in Mexican ground. The joint Mexican and Ophir east crosscut was extended 15 feet; total length, 387 feet.

CHOLLAR.—A considerable amount of ore is still being hoisted at the Sharon shaft on the croppings. A good deal of underground work is being done for the company by the Hale and Norcross folks, as will be seen by the report on the operations of the latter company.

SIERRA NEVADA.—On the 520 level west crosscut No. 9, from the north lateral drift No. 2, 160 feet south from west crosscut No. 1, was extended 65 feet; total length, 162 feet. The face is still in porphyry and clay that contains some quartz.

BELCHER.—There is still a lack of milling facilities, but this will be partially remedied in a short time, when more men may be kept at the work of ore extraction. A good deal of ore is being opened up at several points in the old upper levels.

YELLOW JACKET.—The daily yield has been increased from 160 to 200 tons since putting on the additional mill. Nearly all this comes from the 1300 and 1400 levels. Above these levels a large amount of prospecting is being done.

ALTA.—Work is progressing about as usual at the various points. A curious circumstance is the finding of some small streaks of coal in a sedimentary stratum that occurs about the 825 level.

OPHIR.—On the 1065 level west crosscut No. 1, from the south drift, was extended 30 feet; total length, 285 feet. This crosscut is showing a good deal of quartz of a promising appearance.

GOULD AND CURRY.—On the 300 level some good milling ore is being found. The work on this level is principally confined to running prospecting drifts and making upraises in the old stopes.

UTAH.—On the 472 level the north drift from the main west drift was extended 30 feet; total length, 566 feet. The face is in vein porphyry and clay of a favorable appearance.

ANDES.—A deposit of ore of very good quality has recently been found on the 240 level. It was about eight feet in width, and appears to be holding out very well.

SCORPION.—The east drift on the 300 level is progressing at the rate of 30 feet a week. It is in a mixture of quartz, clay and porphyry.

VIVIAN.—Ore that it is thought will pay about \$30 is now in sight in this Silver City mine. The last lot was worked at Pollard's mill.

JUSTICE.—A considerable amount of fair milling ore is still found in prospecting on the 250 and 310 levels.

HAYWOOD.—The Briggs and Thompson mills are still running on ore from this mine.

Central District.

LOCOMOTIVE.—*Silver State*, April 27: J. F. Clark, who owns the Locomotive mine in Central district, informs the *Silver State* that it is paying handsomely. He built a small mill, which is run by water-power, on the river, and runs it in the day-time only, crushing about three tons of ore daily. This pays a fair profit and gives employment to several persons. If silver was higher the mill and mine would be run day and night.

Lone Mountain District.

THE KING MINE.—*Tuscarora Times-Review*, April 29: From Mr. S. G. Weston, we learn that the crosscut from the bottom of shaft No. 1 has cut through an ore body 23 feet in width which gives an assay of 30 ounces in silver and \$5 gold per ton. The ore at that point is carrying more lead, and the indications are that at a greater depth it will turn to smelting instead of milling ore, as nearer the surface. The mine is owned by Edward Rielly and George Bliss, a well-known banker of New York City, and S. G. Weston, of Tuscarora.

Montezuma District.

LIVENING UP.—*Inyo Register*, April 29: Fred Mengel reports the old Montezuma district, in Esmeralda county, Nevada, as livening up to a certain extent. J. B. Stoddard, the agent in charge, has a large lot of ore on hand, which will be shipped to Reno for reduction. Work is being pushed on the mines, and a great deal of ore will probably be shipped this summer.

Morey District.

PROSPECTING.—*Belmont Courier*, April 30: Prospecting is being pursued systematically in the mines of Morey district.

Ophir Canyon District.

STRIKES.—*Belmont Courier*, April 30: Supt. T. A. Oliver informs us that two more rich strikes have been made in the Chicago M. & R. Co.'s mine in Ophir canyon, Nye county. This mine is gradually developing into one of the finest properties in the country. The concentrators are doing good work.

Osceola District.

CONSOLIDATION.—*White Pine News*, April 25: Duff Brown has high hopes of the future of Osceola, but thinks the days of her prosperity would be much nearer if a consolidation of all her quartz mines could be made, and a wealthy corporation induced to take hold of the whole enterprise. He has been working for that end all winter.

Rebel Creek District.

A NEW MINING DISCOVERY.—*Silver State*, April 26: Commissioner Stone is the proud owner of a one-third interest in the Centipede claim, recently discovered two or three miles from Snapp's station, on the Idaho road. A sample of the croppings of the lead assayed \$44.77 in gold and \$38.60 in silver to the ton. A few feet below the surface free gold is visible in the quartz.

Tuscarora District.

NORTH BELLE ISLE.—*Times-Review*, April 29: North gangway from the south end line, advanced 20 feet. The formation remains the same.

NAVAJO.—Winze on east vein, 150-foot level, sunk 15 feet. The vein continues about the same. Have commenced enlarging the pump station on the 350-foot level to make room for an additional pump, preparatory to receiving the water from the north end mines. The lower levels are filled, and the vein is within 12 feet of this level.

NEVADA QUEEN.—Have started drift from the 70-foot level of North Belle Isle at the line. It is 135 feet from the surface; 16 feet made since starting. Work of rebuilding hoisting works is progressing. Foundations for engine and reel will be finished to-morrow. Other parts of the works will be pushed as fast as material can be obtained.

Wild Rose District.

PARADISE VALLEY.—*Silver State*, April 27: For the week, milling ore produced and delivered to the mill, Paradise mine, 61,670 pounds; Wild Goose mine, 65,360; total, 63 tons, 1030 pounds. Average assay value, per ton, 36.34 oz. silver; 0.18 oz. gold. Mill run 188 hours and reduced 94 tons of ore and 63 tons blanket sweepings. Number of men on payroll, 97. Getting some good ore from the stopes in the upper level of the Wild Goose mine. The south drift, 100-foot level, continues to improve as we advance. The south drift, 200-foot level, looks more encouraging.

ARIZONA.

MOHAVE.—*Miner*, March 30: Messrs. Kennedy and Richards made a three-ton shipment from the Little Chief mine, at Stockton Hill, to our sampling works on Wednesday which worked over \$300 to the ton. The Golden Gate M. and M. Co. are making preparations to patent their millsite immediately. It is reported that the Peabody M. Co. has sold the Signal mine in Owens district for \$75,000. The mine joins the old McCracken. Mr. Dana, of the C. O. D. mine, had about 14 tons of ore run through the sampling works. The ore sampled 260 ounces per ton in silver. Gray Bros., of Stockton Hill, sent down two big lots of ore from some of their claims at that place.

CHANCE.—Considerable work is being done at this mine, the property of Messrs. Gage and Leach. Drifting from the main shaft is being done at 150 and 175 feet, and quite an amount of good ore is being extracted.

GRAND CENTRAL.—*Tombstone Democrat*, April 30: On the new double compartment shaft on the Grand Central, sinking was discontinued yesterday, and will not be resumed until the hoisting engine is in place.

SILVER THREAD.—Crosscuts are being run on the 200 and considerable stoping is being done on the 100-foot level. About 160 tons of ore have been shipped up to date for the month of April.

LUCKY CUSS.—The main product of this mine is being shipped to the Girard mill, while the manganese ore goes to the Charleston smelter. The mine is a steady producer.

JONATHAN.—Sinking in the shaft is being continued, while two drifts are being run along the vein, with encouraging prospects.

BOSS.—The shaft is down 280 feet, and sinking will be continued. Considerable ore has been shipped during the month.

MAINE.—This is turning out its usual ratio of good ore, which is being shipped to Socorro and

Pueblo, Blaett, Trozona and other chlorides are doing very well at the Mamie. The ore occurs in small seams, but it is very rich.

TRIBUTE.—Considerable development work is being done, and some ore extracted from the upper levels.

COLORADO

STRIKE IN THE BELCHER.—*La Plata Miner*, April 25: An important strike was made in the Belcher mine Tuesday, which bids fair to mark an epoch in the history of that property. It is the largest body of ore opened in the mine for over a year. For several months the lessees have been driving an exploring drift from a winze, between the second and third levels. After doing some 60 odd feet of work in barren ground, they suddenly opened up a body of galena heavily seamed with gray copper, and of a splendid grade. The streak averages ten inches in thickness, and is as solid and compact as it can be. A block of ground 150 feet high is above the level, and represents just that much stoping territory.

TUNNEL ENTERPRISE.—*Georgetown Courier*, April 29: That Georgetown is to have her share of prosperity in this bright and hopeful year of our Lord, 1887, our readers cannot doubt when they learn the magnitude of the work to be immediately undertaken by Hon. G. W. Hall for the development of the Leavenworth mountain mines. Immediately east of the Big Mill, on the C. C. road about a mile south of the town, Mr. Hall has already secured ample dumping ground, building room and the land necessary to inaugurate in a practical way his idea of running a tunnel through Leavenworth mountain, cutting well-known properties in its lateral course, and possibly projected to the Colorado Central mine, 4500 feet away, which vein it will cut 500 feet below the Ocean Wave tunnel level, or 250 feet below the deepest workings of the mine, passing 2000 feet below the apex of the mountain. The size of the tunnel is 8 by 7½ feet, and it is to be supplied with double track. As soon as the tunnel reaches bedrock the heavy plant of machinery will be in place, and the work will be prosecuted with Sergeant power drills and three shifts of men per day. This tunnel will cut the tremendous veins on the north slope of Leavenworth, hitherto almost inaccessible because of the deep slide, and will open up the gold belt that is now attracting the attention of Eastern capitalists.

IDAHO.

OPHIRVILLE.—*Murray Record*, April 27: Yesterday a *Record* reporter took a ramble to the arastras above town. At the mother lode the tub was grinding away as usual. A fine body of ore shows up in the breast of the Clark tunnel, as also the one above. A new tunnel has been started farther up the hill where the work is being done by contract. The Occident boys are running the two tubs of their arastra, reducing three tons of ore per day. The Treasure Box Co. is also running its tub, making a sum total of five tons per day, or say 150 tons of ore crushed per month, estimating \$50 per ton saved by the arastra process, and we know it has averaged far in excess of this sum. The yield of these three arastras by this crude method of reducing is \$7500 per month.

THE TYRANNUS MINE. under lease to Charley Davis, is working four men, who have been steadily employed all winter. The result of operations is about \$14,000 worth of ore on the dump.

THE GALORE.—The controversy over the possession of this property has reached an amicable settlement, and work has again been resumed.

THE KING OF THE WEST is looking better than ever before. Fourteen men are now at work—all that can be advantageously employed at present. New machinery for the mine has been ordered.

THE DOLLARHIDE MINE looks extremely well, and a fine quality of ore is being taken out. The property is now in good shape to produce a large quantity of ore.

THE KEYSTONE MINE, owned by Wm. Kirkham, has lately come into prominence and is earning a good reputation. The find in this property has given the greatest encouragement to owners of claims lying in close proximity, and prospecting will be earned on vigorously along the line.

THE CROCUS VEIN.—*Wood River Times*, April 27: Thompson, the foreman of the Crocus mine, came in yesterday, and reports that the ledge was cut into in the tunnel, a few days ago, and that although the drift is now in and over 20 feet there is yet no sign of the other wall. The ore is of high grade.

THE NAYAU MINE.—Foreman Thomas, of the Nayaug, is getting in his supplies and completing preparations to start up work next Monday, with a force of ten men. Mr. Thomas feels very sanguine of making a good record, as he has 300 feet of "backs" to start with.

OTHER SIDE MINING NOTES.—*Murray Record*, April 23: Work commenced yesterday on the Myrtle claim. Night and day shifts will be employed in drifting. On account of the extra flow of water this work could not be started sooner. The Black Hills claim will be a scene of bustling activity in a few days. Dan McGrath is piping on Montana bar. In Placer gulch the Miller claim is being worked by a day and night force. Gill Chinn and Ortiny are cleaning bedrock with good results. In Potosi gulch on the Heller claim they are driving the flume toward bedrock in the gulch and piping on the bar. Hall & Co. are working in a side gulch and doing well. Tom Shuster is cleaning bedrock and piping in American gulch, a tributary of Potosi, and is getting splendid pay. A day and night force is kept busy on the Galivan claim sluicing and cleaning bedrock.

ON UPPER TRAIL.—Nickerson & Co. are working six or eight men on the Nickerson claim. Carr & Co. have four men ground-slucing. Bankin & Co. are sluicing a bar and cleaning bedrock. On Prospect gulch, a tributary to Trail, Felton and Fisher are at work. They took out 14 ounces the first week, which is not considered much in that locality. On Beaver creek at the mouth of Bob Tail gulch, Malarkey & Co. are working Beaver bar. The adjoining claim, close to Scott's gulch, is being piped and is producing well. All the above mentioned claims and many others in that section

are well-known gold-producers, and while the water holds out a stream of gold will be pouring into the back at Delta.

AT SMOKY.—*Cor. Ketchum Keystone*, April 30: The improvement in the camp is not confined to one or two mines, but appears to be universal, and some of the claims barely prospected bid fair to develop into bigger paying properties than any of the best producing mines of the present. With the brilliant prospects of a busy and remunerative season before them, the miners and claim-owners are anxious for the snow to go. It is estimated that when work is fairly started there will be fully 500 men at work here within the radius of a few miles. From every quarter the news is of the most encouraging character. One of the most important of the late strikes is that made in the Carrie Leonard mine, one in the lower tunnel, the other above the Pot Wrestler location. The character of the ore in both these strikes is similar to that found in the Fourth of July tunnel of the mine, of a fine grade, and there is every indication of the new find developing into a great body of good-paying ore. The ore-houses are filled and the drifts piled up with ore waiting for shipment.

MONTANA.

VIRGINIA CITY.—*Cor. Inter-Mountain*, April 26: Guleh miners realize that they have abundance of water stored away in the huge banks of snow which crown our mountains, but are a little impatient at the indifference of the weather clerk in thawing it out. All the fluming companies are ready to commence operations, and the indications are good for a very busy season in the placer mines. Quartz mine trades which promised so much during the winter have come to naught by reason of the alien law. It is now understood that H. C. Foljambe, who had a bond of the Prospect mine, and who considered that he had the property placed in London, attributes his failure to the operations of this law. Late reports from Mr. Foljambe assure us that he has interested New York parties in our mines.

DIVIDEND.—*Inter-Mountain*, April 27: The Moulton has declared another dividend of \$30,000, making the twelfth to date, and aggregating \$350,000. The mine and mill are in fine shape, and there is a certainty of frequent dividends in the future. The Moulton is one of the best managed mining institutions in the West, and is a credit to the camp and to the Territory.

BLACK PINE.—A letter from J. H. Harper, who is over at Black Pine, reports that they now have four feet of fine ore in the east drift of the 100-foot level of the Oxide.

ORE.—*Butte Miner*, April 27: The Old Lexington mill will start up in a few days on ore from the Josephine and Sister mines. The work of putting the mill in readiness is rapidly going on; 225,000 feet of lumber was consumed in this camp last month, chiefly used in and about the different mines. The Morning Star sent home all their men last evening for the purpose of closing down. Pumps will be kept running two or three days longer in hopes that some arrangements may be arrived at as to further workings. When the pumps are hoisted, it will compel other mines on the same vein to pump or close down.

NEW MINING DISTRICT.—*Salt Lake Democrat*, April 29: A new mining district has just been discovered in Montana, not far distant from Lyon City. Rich samples of copper galena ores are coming from there to this city to be assayed. Some ores carry not only a very high percentage of copper, but also 60 ounces of silver, and specimens of galena, carrying 17 ounces silver and 70 per cent of lead, are also coming from there. New locations are being made, and all in that section are pretty much excited. The district will be known as the Vipond mining district.

JEFFERSON COUNTY.—*Cor. Butte Miner*, April 30: The Kit Carson mine, owned by ex-Governor Hauser, and superintended by Robert Gibbons, is well developed, and but very recently shipped seven tons of ore taken from a new level. The mass assayed by battery \$70,000. In this locality the ore carries gold as well as silver. Placers have been worked and prospectors are now handling the surface ground. Among the latest discoveries is one called the Georgiana, and owned by T. W. Noyes and partner. The shaft is down but 10 feet on a vein seven feet wide, carrying three inches of white talc on the footwall. The rich pay streak is about three feet in width, and assays into the hundreds very often, but generally goes but from 60 to 120 ounces. Adjoining the Georgiana is another claim, owned by Colonel Horst and one partner. This body of ore is evidently situated on a contact vein, but carries a different class of mineral. In all probability this portion of Jefferson county will eventually develop some of the richest properties on the Pacific slope. Very much prospecting will be done the present season.

THE CUSTER.—This valuable property, owned by Peter Pfeiffer and George Fitchner, is looking so favorable that the owners refused, a few days since, \$50,000 from a Helena syndicate. The syndicate are already heavy owners in this section, have invested over \$250,000, and are anxious to get control of all the valuable properties in the vicinity. The Custer is being pushed by tunnel and shaft.

ANACONDA.—*Review*, April 28: Our mining reporter got snowed in this week while trying to get up into Oleson gulch. Only a few miles above Anaconda snow fell almost continuously last week. Of course all mining activity in that vicinity has been temporarily suspended, and the prospectors have been driven in. Frank G. Brown, of the Blue-Eyed Nellie, reports that property looking finely and a full force of men at work. The ore is still being shipped to the Omaha & Grant smelter at Denver. In the mining district further above there is but little activity as yet on account of the deep snow. Silver lake is right in the heart of the snow country, and on that account there is nothing whatever being done in that region. The Cable mine is running, though the mill has been shut down for some time. It will probably be started up again in the near future. At Georgetown, the Pyrenes mine is working 22 men. They are in a fine body of ore. A sale of this property is contemplated. Salton Cameron is doing some development work on the Luxembourg, which is one of the most promising mines in the Territory. The Grubstake and other promising mines are still covered up in the deep snow. J. W. Gil-

lenden is working on the Contra Costa mine, which is situated on the hillside about 1½ miles south of Anaconda. He has a four-foot vein between well-defined walls. The ore is carbonate, and some specimens of it have assayed very high. The general impression prevails among mining men and men posted on mining matters that the coming year will be an eventful one in Montana mines, and that no district will come more rapidly to the front than that just west of Anaconda.

THE SMELTER.—During the past week the smelter and concentrator have both been running full, day and night. Marcus Daly is now in S. F., whither it is rumored he has gone to arrange plans about the putting up of smelting furnaces at the lower works.

NEW MEXICO.

KELLY.—*Cor. Socorro Bulletin*, April 25: The Kelly mine still sends out her usual quota of ore regularly. The Tip Top is in first-class ore, and lots of it. The Legal Tender is being worked by Mat Quail, under lease from Billing, and is putting out some very fine galena ore. The Greyhound is putting out some fine ore, and the sulphuret shows up in fine shape. The Yellow Rose is being worked by Robinson. He is driving a tunnel, and so far has crossed several veins of fine iron ore.

GOLD STRIKE.—*Socorro Bulletin*, April 30: Encouraging news of the gold strike in the San Mateo mountains reaches us as we go to press. The last consignment of Tip Top ore brought its owner over \$400 net for a carload. A gold strike in the Magdalena district is reported. The Quartz assays six ounces per ton, or \$153.60 per ton. The Magdalena district at this date possesses the following paying and producing properties: The Kelly, Juanita, Graphic, Greyhound, Review, Imperial, Caven, Ambrosia, Hardscrabble, Tip Top, Fashion and Legal Tender. At this time last year but three were yielding ore for treatment. McLeish and Reddy will recommence work on their Bonaparte claim in Jordan canyon the first of next month, and will continue to develop with a view of furnishing ore to our smelters. The Graphic group of mines, consisting of eight properties in the Magdalena, and of which three are now producing—the Graphic, Greyhound and Review—ship regularly to Socorro and afford the Graphic smelter of this city all the fluxing ore required, leaving large bodies of ore in the mines for future use.

OREGON.

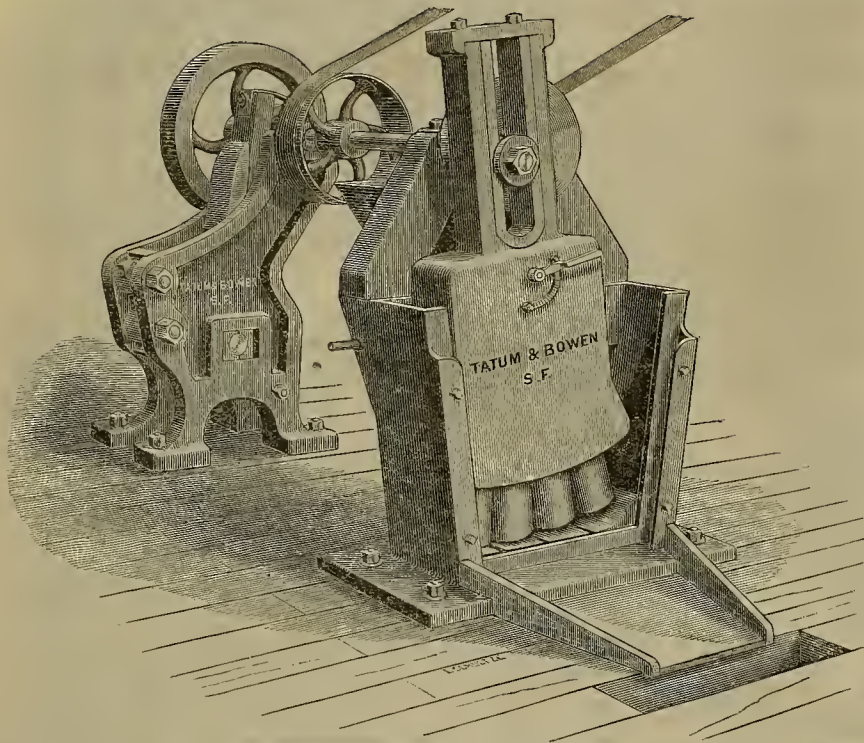
SILVER CREEK.—*Cor. Bedrock Democrat*, April 27: The California shows good ore in five different levels and there are five men working in level No. 2, taking out shipping ore. Cable & Bro. will start level No. 6 in a few days and will also take out some shipping ore that will pay an average of \$250 per ton. On the Mother Lode, Taft & Co. are into the vein about 50 feet and are not yet through it. Assays of the ore body run from a few dollars to \$148, mostly in gold. Probasco & Co. are working four men and running a tunnel preparatory to taking out shipping ore. Mr. Louis Roll is working some mer. on his property and the vein he is exploring shows up well. Messrs. Taber & Swan, on Cracker creek, are now at work in their tunnel. The vein is large and prospects well in free gold. A large vein of hematite iron ore was located a few days since near Sumpter. Mr. Andy Elliott has commenced work on his placer mines just over the summit from Sumpter on the Granite road. At Sumpter, Messrs. Rimbo & Young are getting to work on their placer ground as fast as the ditches are free from snow.

UTAH.

SANDSTONE NOTES.—*Southern Utah Times*, April 25: The discharge of men every few days from the Wyman leachers is an unfavorable indication. At the Buckeye, everything is moving smoothly. The south crosscut on 600 is showing some fine ore and the 700 south is looking well. About two feet of ore has been struck at the bottom of the main incline, and indications point to the opening of a big ore body. Operations are being vigorously pushed in all workings, and the property is looking first-rate. The Banner mine, on the White reef, owned by Huntley, Morgan & Co., is developing into a splendid property; the main workings are a tunnel of 70 feet, which tapped the ledge from that point. A drift has been run south 40 feet and one north 25 feet on the ledge, opening a fine piece of stoping ground. A shaft has been sunk north of the tunnel, and at the bottom a drift south penetrates a fine body of ore of high grade. The owners are extracting but little ore, their plan being to thoroughly open the mine and put it in shape for more extensive operations.

ANOTHER SNAKE CREEK STRIKE.—*Park Record*, April 30: On Thursday a *Record* reporter was shown samples of rich silver ore carrying lead and a trace of gold lately found in Sunny Boy's group in Snake Creek district. The good-sized pay streak, which is identical to other Snake creek ore that has assayed way up in the thousands, was uncovered in the Silver Bell—the extension of the Columbia, at a depth of about 300 feet on the vein. This group of four claims is owned by Frank McLaughlin, F. J. McLaughlin and H. Hirschman, and considerable development work has been done on the claims. This find will add substantially to the promising future of rich Snake creek. The Crescent concentrator will be closed down till about the middle of next week, when ore shipments over the tramway will have been resumed. The run made by the concentrator has been most successful, all the old ore supply having been cleaned up. This month's work of the Marsac mill shows a larger and richer bullion product than for any like period before. The record of this mill, working on Daly ore, cannot be surpassed by any mill in this interior country.

ORE AND BULLION SHIPMENTS.—The Crescent shipped during the week 467,100 pounds of concentrates, but no first-class ore. For the week just ended the Mackintosh sampler received 43,510 pounds of Daly and \$77,390 pounds of Ontario ore; total, 620,000 pounds. On the 24th inst. the Ontario shipped 39 bars of bullion, containing 22,839.83 fine ounces of silver. To-morrow another average shipment will be made. Wednesday, the 27th inst., there was shipped from the Marsac mill six bars of Daly bullion, containing 6599 fine silver ounces, and to-morrow the product will be eight silver bars.



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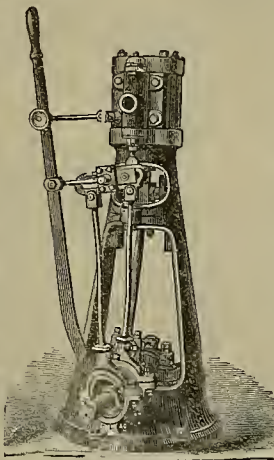
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All parts are interchangeable, and can be readily renewed.

Jaws are hardened to a saw temper, and can be sharpened with a file.

Does not crush pipe; has a quick grip; never slips; chain will not unhitch while in use, but can be instantly released.

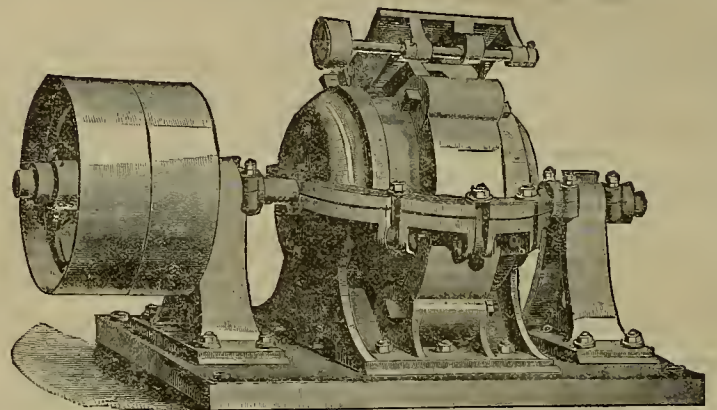
J. H. WILLIAMS & CO.,

Manufacturers of Every Description of Iron and Steel Drop Forgings,

31 RICHARDS ST. (Near Hamilton Ferry),

BROOKLYN, N. Y.

THE FRISBEE-LUCOP MILL,



A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.

All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.

Certificates as to performance of the Mills, and any information required, furnished on application.

THE FRISBEE-LUCOP MILL CO.,

Office, 145 Broadway, cor. Liberty St.,

NEW YORK.

HOOKER & LAWRENCE, Gen'l Agents.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and **GELATINE-DYNAMITE,** Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

WM. H. TAYLOR, President.

R. S. MOORE, Superintendent.

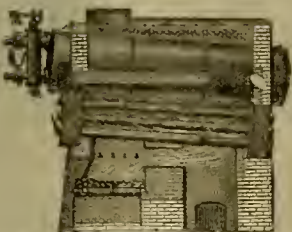
L. R. MEAD, Secretary.

RISDON IRON & LOCOMOTIVE WORKS

Location of Works, S. E. Cor. Beale and Howard Sts., San Francisco.

Manufacturers and Sole Agents for the Pacific Coast for

HEINE SAFETY WATER TUBE BOILER.



Has the Following Advantages:
**SAFETY,
DURABILITY,
ECONOMY,**
AND FACILITY OF INSPECTION AND REPAIRS.

60,000 Horse Power now in use.

Boilers can be seen working in San Francisco at Palace Hotel, Spring Valley Water Works Hueter Bros. & Co., California Jute Mills, and other places.

Guaranteed More Efficient than any other Boiler made.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.
AIR COMPRESSORS—Rope Power Transmission.
HYDRAULIC PUMPING and Hoisting Machinery.
WROUGHT IRON WATER PIPE a Specialty. Note—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.
SAW-MILL MACHINERY of all kinds.
STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.
SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.
MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys, will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.
WILSON'S PATENT GAS-PRODUCER.
STEAM BOILERS of all descriptions.
SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.
STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.
Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.
Send for Circular and Price Lists.

STURTEVANT MILL.

This Mill as a Crusher and Pulverizer is without rival.
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

Huntington Centrifugal QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,
JIGS and TROMMELS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



HOISTING

ENGINES,

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TRAMWAYS.

GENERAL OFFICE AND WORKS:
Fulton and Union Streets, Chicago, Ill.
NEW YORK OFFICE:
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DENVER OFFICE:
No. 248 Eighteenth Street, Denver, Colorado.
MEXICO OFFICE:
No. 11 Calle de Juarez, Ohihuahua, Mexico.
UTAH OFFICE—SALT LAKE CITY, UTAH.

Metallurgy and Ores.

SELBY

SMELTING and LEAD CO.,
416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,
LEAD PIPE,
SHEET LEAD,
SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,
Under Chamberlin Patent.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

ASSAYERS' MATERIALS, MINE
AND MILL SUPPLIES,

CHEMICAL APPARATUS and CHEMICALS, DRUG
GISTS' GLASSWARE and SUNDRIES, ETC.

114-118 Pine Street, - San Francisco.

We would call the attention of Assayers, Chemists Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869

Ores worked by any Process.
Ores Sampled.
Assaying in all its Branches.
Analyses of Ores, Minerals, Waters, etc.
Working Tests (practical) Made.
Plans and Specifications furnished for the most suitable Process for Working Ores.
Special attention paid to Examinations of Mines; Plans and Reports furnished.
O. A. LUCKHARDT & CO.,
(Formerly Hubn & Luckhardt,)
Mining Engineers and Metallurgists.

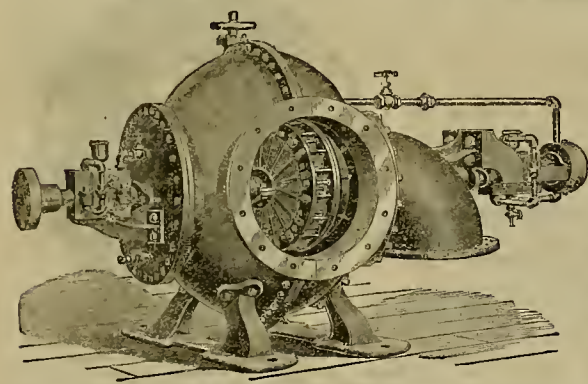
J. KUSTEL. H. KUSTEL.

METALLURGICAL WORKS

318 Pine St. (Basement,
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.
Assaying and Analysis of Ores, Minerals and Waters.
Mines Examined and Reported on.
Practical Instruction given Treating Ores by improved processes.

G. KUSTEL & CO.,
Mining Engineers and Metallurgists.



JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

JAMES LEFFEL & CO.,

Springfield, Ohio, or 110 Liberty St., New York.

FRASER & CHALMERS, General Agents,
Chicago, Ill., and Denver, Col.

PARKE & LACY, General Agents, San Francisco, Cal.

N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.



SAW MILLS AND MACHINERY
Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

Engraving. Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.

THOMAS PRICE'S ASSAY OFFICE,

CHEMICAL LABORATORY,

BULLION ROOMS and ORE FLOORS,

524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed
of in the Open Market to the Highest Bidder.

DEWEY & CO., { No. 250 MARKET ST. } PATENT AGENTS.
Elevator 12 Front St.

Electricity and Ores.

We have several times mentioned the experiments which were being conducted by Dr. Rae, in the matter of saving quicksilver in the working of ores. The process has now passed the experimental stage and is being practically applied at the Douglass mill, at Dayton, Nev. The doctor's original proposition was to save 50 per cent of the present loss of quicksilver, and also to increase from three to five per cent the bullion product. At the Douglass mill the results of the work show a larger saving of mercury than this. The process was at first tried on tailings, but the last workings show it will do equally well upon ores. It may be stated that negotiations are now going on for the introduction of the system in other mills. The following letter from the superintendent of the Douglass mill gives the details of the run just completed:

DAYTON, May 2, 1887.

Dr. J. H. Rae—DEAR SIR: At your request when we started the full mill under the electric system I appropriated two pans and one settler to run separate, that is, to weigh in the quicksilver, and after working 100 tons (twice the amount worked on the test run) clean up thoroughly and weigh back, so as to ascertain the actual loss of quicksilver. No distinction was made in chemicals, tailings, or in working, only to keep the pans separate and distinct. This enables me to approximate very close to the work of the entire mill, 16 pans and 12 settlers. About 1250 tons have been worked to date; 117½ tons in the two pans mentioned, working day and night; amount of quicksilver used, 1935 pounds; amount received back, 1900½ pounds; loss of quicksilver on the 117½ tons, 37½ pounds, a fraction over five ounces to the ton, a saving of about 84 per cent over the old method; in other words, the saving of quicksilver used to date in the whole mill, 16 pans, has been over 2000 pounds. I would add that during the run the lower plug of the settler came out, letting a portion of the charges of the two pans run out into the sluices (which will be recovered in part in our blasket tailings) and would necessarily reduce even the small loss of 37½ pounds. I make the above statement as you requested all the facts, good or bad, and to give the system credit for the actual amount the scales showed. Taking into consideration the condition of our settlers (wooden staves, about 15 years old, and all of them leaking badly for almost the entire run), I think the results are extraordinarily good. The settler samples have been reduced over one-half, consequently the amalgamation is fully as good as on the test run.

I will append report of 14 56-100 tone Hindley ore worked and full return made. This ore was roasted in a reverberatory furnace and worked in ore pan as usual, and worked 94 14-100 per cent of assay value; entire loss of quicksilver, 3½ pounds, as against usual loss of about two pounds to the ton, and also saving gold to stamp to the amount of \$59, where we do not get enough to stamp by the old method, thus showing that the electric system will work equally as well, if not better, upon ores (especially gold ores) than it will on tailings.

You can use the above report as you deem best, and you may refer to me, if you wish, and I will be pleased to answer any such reference.

WM. A. RULISON, Supt. and Assayer
for J. M. Douglass & Co.

Mining Share Market.

Although mining stocks are rather quiet, it is said it has been a long time since there has been so much and such good ore developed and awaiting extraction at so many different points on the Comstock lode. In starting in for a low-grade proposition, some months ago—a proposition to work the mines for all they were worth—ore of high grade was brought to light in half a dozen places in which it was not generally known to exist. Deposits of high-grade ore are still being opened up, while at the same time the mills are being erected that were at first only intended for the low-grade rock. This low-grade ore is still in the mines, where it may be had whenever it is wanted, but in the meantime richer rock is awaiting milling facilities.

The following mining companies report having had cash on hand April 30, 1887: Consolidated California and Virginia, \$171,766.19 cash in bank and unsold bullion assaying \$111,622.94 on hand, inclusive of the shipment of \$77,474.03 made on April 27th; Ophir \$13,020.43, Mexican \$10,337.19, Exchequer \$10,896.91, Potosi \$9,814.50, Occidental \$8263.07, Gould & Curry \$9,808.93 and a balance of \$4542 to be collected on assessment No. 55; Sierra Nevada \$1775.49, Hale & Norcross \$2934.66, Best & Belcher \$20,167.57, Bulwer Consolidated \$8685.65, Peer \$9544.44, Peerless \$11,870.55, Crocker \$3000.63, Chollar \$6471.06, Crown Point \$21,640, Andes \$24,767.77, Alta \$4,153.33, Benton \$24,227.10, Lady Washington \$20,394.83, Union Consolidated \$2337.38, Independence \$8568.32, Navajo \$17,080.83, North Belle Isle \$45,826.21, Belle Isle \$11,377.13, Standard \$14,959.94, Kentucky \$1740.96. The following mining companies report having an indebtedness April 30th: Utah Consolidated overdraft at bank \$1872.37, less \$589.60 cash on hand; Savage \$43,854.62, Mount Cory \$20,071.29; Nevada Queen, approximately \$25,000.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Alice, April 29, \$30,300; Bluebird, 27, \$20,000; Moulton, 27, \$13,184; Alice, 27, \$28,720; Hanauer, 24, \$7075; Bannock, 27, \$1700; Hanauer, 27, \$2000; Hanauer, 28, \$3900; 30, \$1755; Bannock, May 1, \$2700; Hanauer, 1, \$3440.

MINING AND SCIENTIFIC PRESS.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.		LOCATION.		AMT. LEVIED.		DELINQ'T. SALE.		SECRETARY.		PLACE OF BUSINESS.	
Almont M Co.	Arizona.	1.	05.	Mar 30.	May 7.	May 28.	T. Harman.			330 Pine St	
Baker Divide M Co.	California.	13.	25.	Mar 19.	Apr 19.	May 9.	D. M. Kent.			330 Pine St	
Bodie Tunnel M Co.	California.	14.	25.	Mar 2.	Apr 27.	May 20.	C. C. Harvey.			309 California St	
Comstock M Co.	Nevada.	3.	15.	Mar 14.	Apr 23.	May 14.	A. E. Ball.			309 California St	
Con Washoe M Co.	Nevada.	2.	10.	Mar 24.	Apr 23.	May 14.	P. MacEwen.			314 Montgomery St	
Confidence S M Co.	Nevada.	14.	50.	Apr 7.	May 12.	June 2.	A. S. Groth.			414 California St	
Central California Oil Co.	California.	4.	1.00.	Apr 27.	June 6.	June 22.	J. G. Hulce.			314 California St	
Europa M Co.	Nevada.	9.	25.	Apr 5.	May 12.	June 2.	J. J. Morizo.			328 Montgomery St	
Florida M Co.	California.	1.	10.	Mar 10.	Apr 13.	May 7.	T. J. Mitchell.			Grass Valley	
Golden Fleeced M Co.	California.	9.	10.00.	Apr 26.	June 3.	June 30.	W. J. Gleason.			Phelan Building	
Inyo Marble Co.	California.	1.	01.	Mar 15.	May 2.	May 28.	O. F. Von Rhein.			524 California St	
Julia Con M Co.	Nevada.	22.	15.	Apr 18.	May 24.	June 16.	J. Stadfield.			419 California St	
Mayflower C. M Co.	California.	25.	25.	Mar 23.	Apr 25.	May 16.	J. J. Morizo.			328 Montgomery St	
Mayhattan M Co.	California.	3.	1.00.	Mar 23.	Apr 25.	May 16.	A. E. Ball.			309 California St	
Monro M Co.	California.	23.	50.	Mar 31.	May 5.	June 2.	G. W. Sessions.			309 Montgomery St	
Mountain Tunnel M Co.	California.	4.	05.	Apr 14.	May 23.	June 13.	A. B. Paul Jr.			328 Montgomery St	
Navajo M Co.	Nevada.	17.	15.	Mar 14.	Apr 21.	May 13.	J. W. Pew.			310 Pine St	
North Belle Isle M Co.	Nevada.	12.	50.	Apr 19.	May 11.	June 11.	J. J. Scoville.			310 Pine St	
Paul Sheridan M Co.	California.	1.	10.	Apr 18.	May 25.	June 15.	J. J. Scoville.			309 Montgomery St	
Richell M Co.	California.	3.	12.	Mar 9.	Apr 15.	May 12.	G. L. Lansing.			4th and Townsend St	
Sierra Nevada S M Co.	Nevada.	38.	25.	Apr 13.	May 18.	June 6.	E. S. Parker.			39 Montgomery St	
Scorpion S M Co.	Nevada.	21.	10.	Apr 27.	June 3.	June 24.	G. R. Spinyer.			310 Pine St	
Trejan M Co.	Nevada.	3.	20.	Apr 18.	May 25.	June 15.	J. J. Scoville.			309 Montgomery St	
Union Con M Co.	Nevada.	3.	20.	Mar 31.	May 6.	May 29.	J. M. Burlington.			309 California St	
Utah Con M Co.	Nevada.	1.	25.	Mar 6.	May 9.	May 26.	A. H. Fish.			309 Montgomery St	

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Morvan M Co.	California.	C. S. Neal.	230 Montgomery St.	Annual.....May 7
North Star M Co.	California.	D. A. Jennings.	401 California St.	Annual.....May 11
Scorpion S M Co.	Nevada.	G. R. Spinyer.	310 Pine St.	Annual.....May 9

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50.	Apr 7
Original Hidden Treasure.	Nevada.	D. A. Jennings.	401 California St.	13.	Apr 4
Plymouth Con M Co.	California.		New York.	25.	Apr 4
Pacific Borax, Salt & Soda Co.	California.	A. H. Clough.	431 California St.	10.	Apr 7
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	10.	Apr 15
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	May 15

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, May 5, 1887.

ANTIMONY—French Star.	94 @	8
BORAX—San Bernardino.	74 @	8
Armadillo.	74 @	8
IRON—Glenbrook ton.	—	@27 00
Eghuton, ton.	—	@25 50
American Soft, No. 1, ton.	21 00	@28 00
Oregon Pig, ton.	21 00	@28 00
Clippier Gap, No. 1 & 4.	22 00	@23 50
Clay Lane White.	22 50	@
Shotts, No. 1.	23 00	@
COPPER—		
Booth.	20 @	—
Sheathing.	18 @	—
Ingot.	123 @	131
Fire Box Sheets.	—	@ 20
LEAD—Pig.	5 60 @	5 50
Sheet.	8 @	—
Shot, discount 10% on 500 bag.	Drop, 1 bag.	1 65 @
Buck, 1 bag.	1 85 @	—
Chilled, do.	1 85 @	—
QUICKSILVER—		
Flasks, new.	1 05 @	—
Flasks, old.	85 @	—
STEEL—English, lb.	14 @	—
Black Diamond, ordinary sizes.	10 @	—
Plew.	4 @	5
Machinery.	5 @	6
Sanderson Bros.	10 @	—
ZINC—German.	8 @	9
Sheet, 7x3 ft, 7 to 10 lb, less the case.	6 @	4 95
TIN PLATE—Coke.	4 25 @	4 95
Charcoal.	6 25 @	—

New York Metal Market.

Telegraphic advices dated May 5th give the following New York prices:

BAR SILVER—94½c per oz.
BORAX—\$1.04½.
COPPER—LARK—\$10.40.
IRON—No. 1, \$22.00.
LEAD—\$4.30 @ \$4.35.
QUICKSILVER—53 @ 54c.

The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Quiet, spot closing at \$9.95 @ 10.00. Transferable Notices (Lake) issued at \$10.00 @ —. Transferable Notices (Chili Bars) issued at \$9.10.

LEAD—Quiet at \$4.25 @ \$4.30 spot. Transferable Notices issued at \$4.27½.

TIN—Quiet at \$22.50 @ \$22.60. Transferable Notices issued at \$22.50.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.

Australian Tin, \$22.60 @ \$22.75; Billiton Tin, \$23.10 @ \$23.40; Banca Tin, \$23.15 @ \$23.60; Baltimore Copper, \$9.00 @ \$9.25; Orford Copper, \$9.00 @ \$9.25; P. S. C. Copper, \$10.00 @ 10.25; Foreign Lead, \$4.75 @ \$4.80; Foreign Spelter, \$4.70 @ \$4.75.

MAKERS' PRICES—At tidewater. 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lough, Grade No. 1, \$21.00 @ \$21.50; No. 2, \$20.00 @ \$21.00; Grey Forge, \$17.50 @ \$19.00; Southern, Grade No. 1, \$21.50 @ \$22.00; No. 2, \$21.00 @ —; Grey Forge, — @ —.

To Those Visiting San Francisco.

The many readers of this paper who may contemplate a visit to the city would do well to stop at the American Exchange Hotel, it being so centrally located for merchants, farmers, miners, and mine-owners with their families, that we can safely recommend it to those who may be looking for a quiet, respectable and well-kept hotel. The proprietors, Chas. and Wm. Montgomery, have been long and favorably known as hotel-men, and the amount of business done is the best guarantee of the merits of the hotel.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. Look CAREFULLY AT THE LABEL ON YOUR PAPER.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING APR. 14.	WEEK ENDING APR. 21.	WEEK ENDING APR. 28.	WEEK ENDING MAY 5.
Alpha.	3.25	3.75	4.00	4.13 3.50
Alta.	2.00	2.40	2.20	2.40 2.45
Andes.	.95	1.30	1.40	2.00 1.55
Argenta.	.10	.10	.20	.25 .25
Belcher.	2.70	3.25	3.10	4.23 3.85
Brophy.				
Best & Belcher.	5.50	6.50	8.00	7.00 6.50
Bullion.	1.95	2.35	2.25	3.00 2.30
Bulwer.	1.00	1.00	1.00	1.15 .90
Belle Isle.	.60	.70	.45	.70 .75
Bodie Con.	2.15	2.20	1.10	2.20 2.70
Benton.	.60	.75	.70	.80 .85
Bodie Tunnel.				
Con. Va. & Cal.	1.10	1.15	1.20	1.25 1.15
Challenge.	2.00	2.25	2.20	2.50 2.20
Champion.				
Chollar.	5.75	6.00	5.75	6.00 6.50
Confidence.	7.00	8.00	8.00	8.50 8.00
Con. Imperial.	2.00	2.00	2.25	2.00 2.75
Caledonia.	.45	.60	.55	.65 .55
Con. Pacific.	.25	.25	.30	.30 .30
Crown Point.	3.85	4.25	4.25	5.75 5.00
Crocker.	.90	1.00	.85	1.00 .85
Central.	.70	.70	.75	.60 .65
Dudley.	.25	.25	.25	.30 .50
East B. & B.				
Eureka Con.	1.10	1.50	1.65	2.00 1.65
Exchequer.	3.10	3.50	3.50	4.00 3.50
Grand Prize.				
Gould & Curry.	2.90	4.15	3.25	5.00 3.80
Hale & Norcross.	3.25	5.00	5.00	6.50 4.75
Holmes.				
Independence.	.40	.40	.40	.40 .40
Iowa.	.90	.90	1.10	.90 1.00
Julia.	.40	.50	.45	.95 .40
Justice.	1.05	1.30	1.30	1.40 1.30
Kentuck.	1.25	1.30	1.30	1.50 1.25
Lady Wash.	.60	.50	.45	.55 .55
Martin White.				
Monro.	1.95	2.00	2.00	2.25 2.35
Mexican.	3.45	4.40	4.50	5.25 4.60
M. D. Diablo.				
Northern Belle.	4.00	3.75	4.00	3.50 4.25
Navajo.	.90	.95	1.15	1.30 .90
North Belle Isle.	6.25	7.00	7.00	8.50 7.75
Niagara.				
Queen.	1.90	2.60	2.30	2.80 2.05
North G. & O.				
Occidental.	2.55	2.90	2.90	3.60 .50
Ophir.	5.50	7.50	5.25	9.00 7.50
Overman.	1.35	1.45	1.45	1.60 1.55
Potosi.	.60	.75	.75	8.75 7.25
Peoples.	.55	.70	.60	.70 .65
Perc.				
P. Sheridan.	.05	.05	.05	.05 .05
Silver Star.				
Savage.	1.50	1.55	1.55	1.60 1.55
Seg. Belcher.	1.50	1.55	1.00	
Sierra Nevada.	2.75	3.55	3.40	4.60 3.10
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Syndicate.	.15	.15	.15	.20 .25
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160 Andes.	1.65 1.70	50 Hale & Norcross.	4.95
100 Atlantic.	.40	100 Iowa.	1.00
2550 Argenta.	30c	1000 Justice.	1.30
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130 Bullion.	2.35 2.40	110 Mexican.	4.95
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50 Bulwer.	1.30	13 Ophir.	.80
150 Bodie Con.	2.90 2.25	30 Potosi.	.70
200 Chollar.	.60	100 Savage.	.55
35 Con Va. & Cal.	.14	100 Sierra Nevada.	3.60
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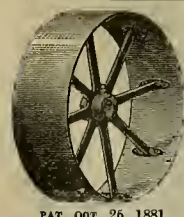
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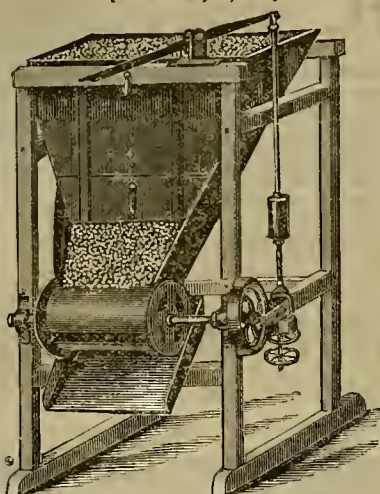
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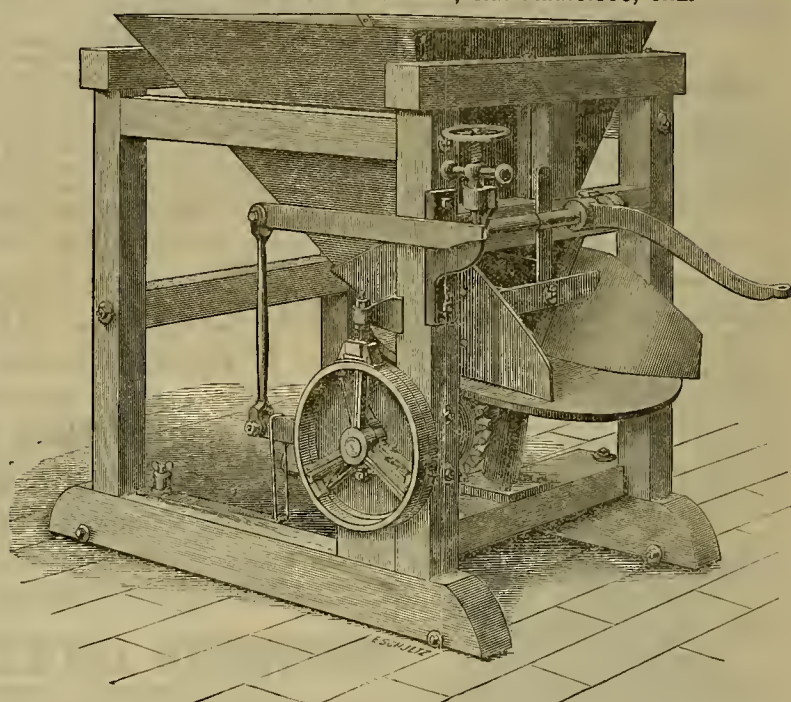
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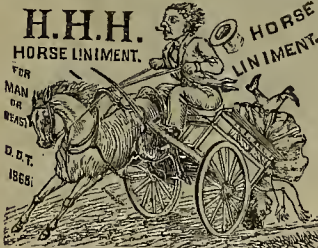
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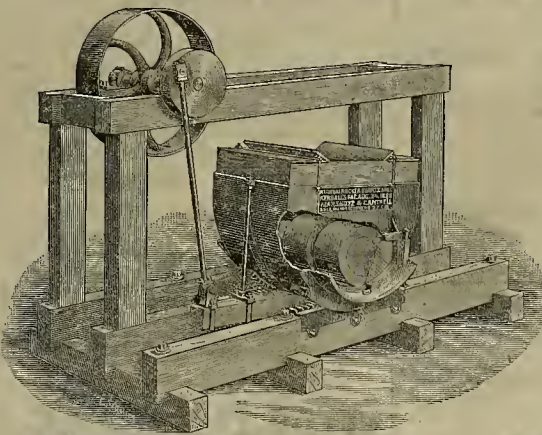
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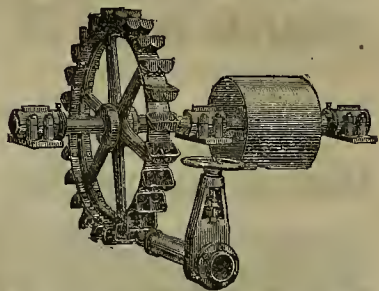
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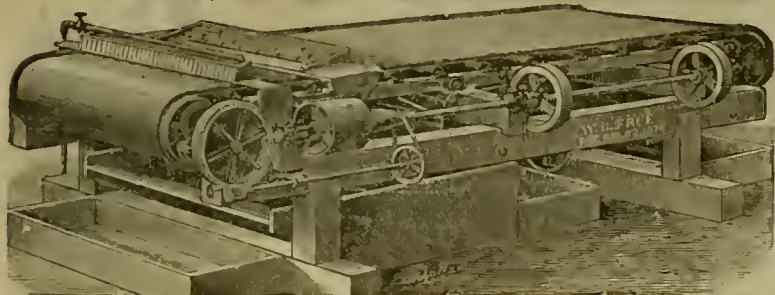


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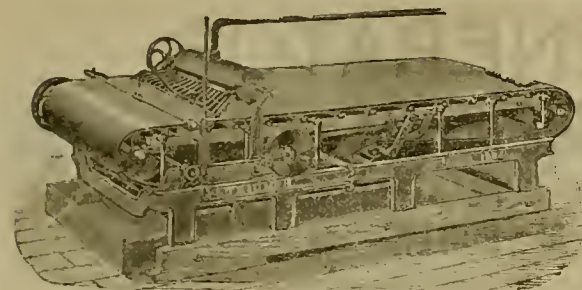
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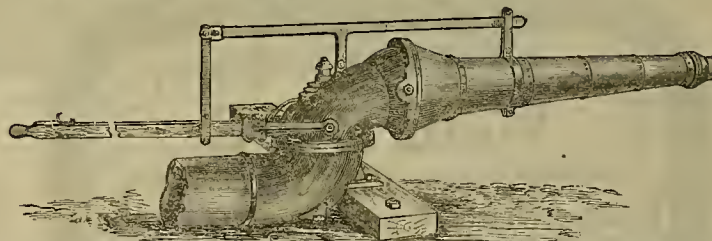
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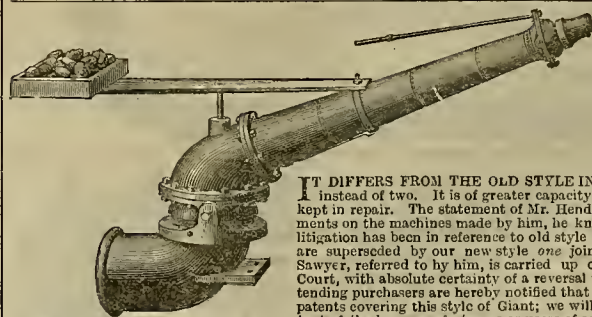
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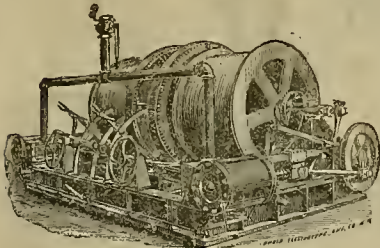
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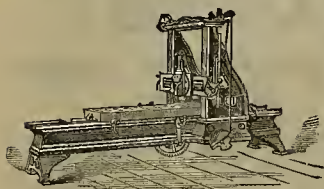
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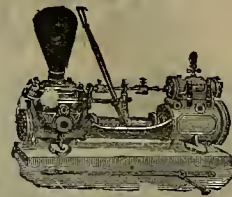
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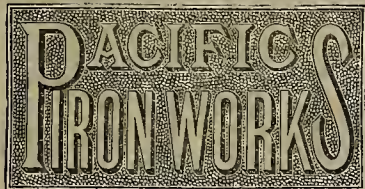
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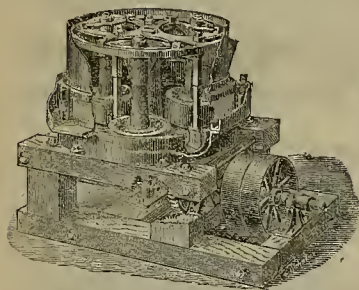
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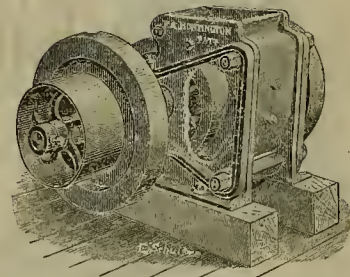
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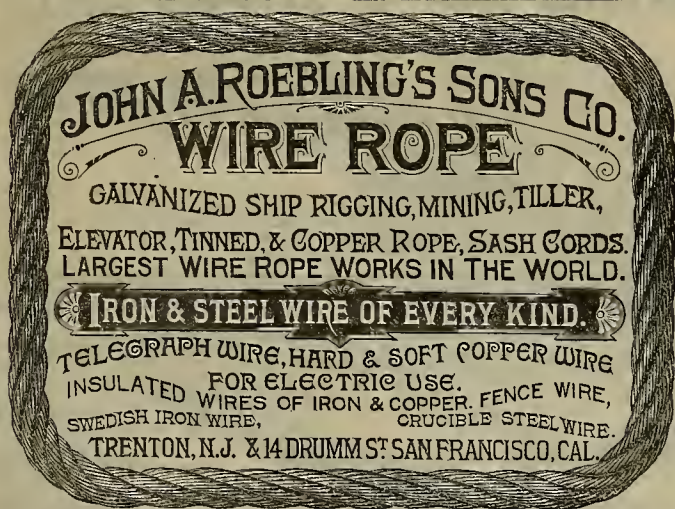
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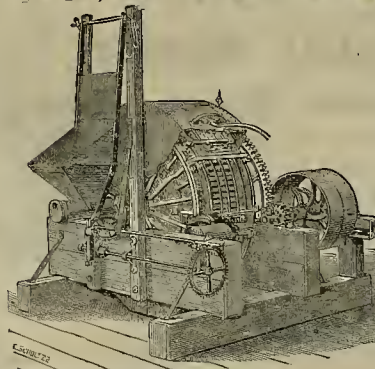
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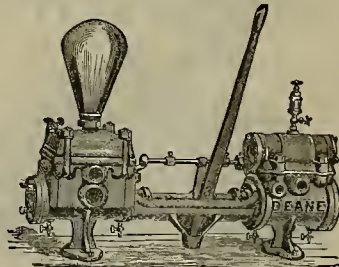
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, MAY 14, 1887.

VOLUME LIV
Number 20.

Immigration and the Mines.

The whole State of California seems to have entered on an era of prosperity. The influx of population, first felt in the southern counties, is gradually spreading in all directions, and the vacant spaces are settling up. Lands which have long been valueless have come into the market, and others which have been cultivated for years have greatly enhanced in value.

It is not alone in the country that this progress is felt, but naturally all the towns and cities are improving, too. New towns are springing up, and buildings are going up on all sides. It is noticeable that nearly all the towns and cities of the State are making efforts toward improvement. Hotels are being built, gas-works erected, railroads built, sewerage systems laid out, water-works prepared, public buildings erected, and every preparation being made for more prosperous times.

It was only a question of time when the remarkable climate and manifold resources of California would be more universally recognized. Of course, we were, for many years, more or less isolated, but the building of railroads has brought us closer to older centers, and the people who have been living in climates where they have great heat and cold are realizing that California will be a more comfortable place to reside. And with this increase in population and settling up of the country, we may be sure that the mines will not be neglected. It is not to our credit that we have let the wealth at our doors lie so long undeveloped. Mines have gone begging for years, and our California capitalists have been readier to lend money for some one else to risk than to invest it themselves. Many have had an abiding faith in our gold mines, and their rewards will now come. Eastern people who have come into the southern part of the State have been quick to see the value of the mines down there and have invested in them. In some of the old districts that have lain idle for years, they have taken hold and are making money. When more of them come to the upper part of the State, they will take hold of the mines here, too. Those who have quartz properties will not have to wait much longer to dispose of them, if they so desire. Then, perhaps, when these mines become valuable, as Southern California lands have, we will all be surprised that we did not "see" it before.

THERE is a boom in mining circles at Tucson, A. T., and the merchants contemplate building sampling works and smelters.

FROM lack of room to store silver the local banks refuse to receive silver on deposit.

The Keystone Boiler.

The accompanying engravings are sectional views of the Keystone boiler, built by Cleveland & Hardwick, of Erie, Penn., for the sale of which the Jobna Hendy Machine Works, in this city, are agents. It will be seen that this boiler is a modification of the well-known marine boiler, so largely used in steamship service. To those who want a strong boiler, possessing all the advantages of the ordinary tubular boiler, without the troublesome task of setting it up, and the attendant expense of brick work, etc., this boiler commends itself.

The furnace is surrounded by water on all sides but the front. Its size is ample for the economical combustion of fuel. It has no brick supports to be a source of trouble. Being a re-

falls low enough to uncover the tubes and be dangerous.

A curved deflecting plate is placed in the back connection, to keep the hot gases from striking the door, and is readily removed for the ordinary purpose of cleaning, inspection, etc.

The return tubular feature of this boiler, in addition to its value in point of economy, affords such means of combustion being perfected in the back chamber, that the danger of sparks is almost entirely obviated.

The Keystone boiler is strongly made of steel of full thickness. The bracing and stay bolts are all ample for a working pressure of 100 pounds to the square inch, sufficient margin being allowed to compensate for the effects of use. They are tested under cold-water pressure to 150 pounds and calked under a heavy steam

Mining Bureau Field Work.

When the appropriation for the maintenance of the State Mining Bureau was made during the recent session of the Legislature, it was provided that a certain proportion of the money should be spent each year in field work. It was the case that most, if not all, the money had usually been spent in the museum and very little had been done toward obtaining practical information in the mining regions outside that relating to minerals. With his last, or rather first report, the new mineralogist made a beginning in this direction, by obtaining some facts relating to certain mines, but the limited time and funds at his disposal prevented any very thorough work.

Now, however, with a better appropriation, Mr. Ireland and the trustees have set to work in earnest and have employed competent persons to investigate certain questions, and the information will be published when gathered. Mr. Melville Attwood, the well-known geologist and pioneer gold miner of this State, has started this week for Nevada county, where he will make a study of the wall rocks and gold ores of that region, and gather information concerning the occurrence of gold in quartz. Mr. W. A. Goodyear is already in the field and is at present studying up the petroleum de-

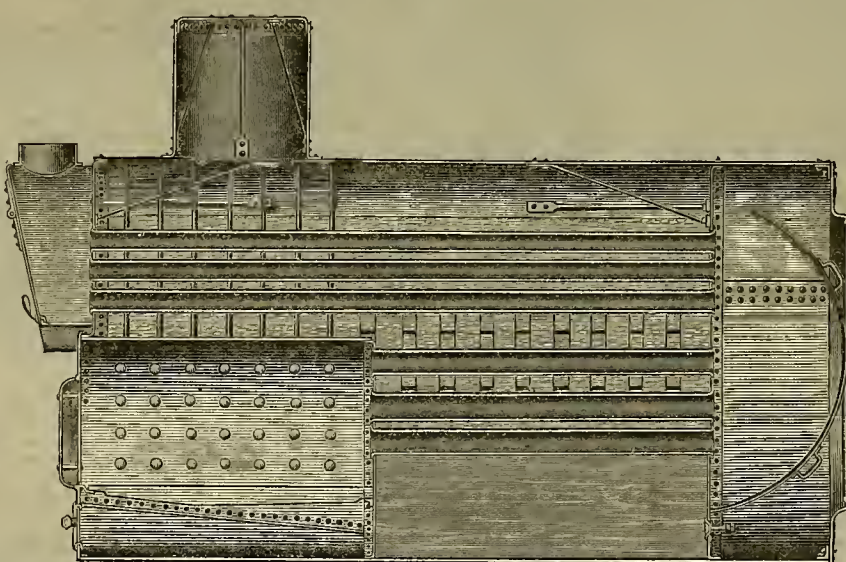
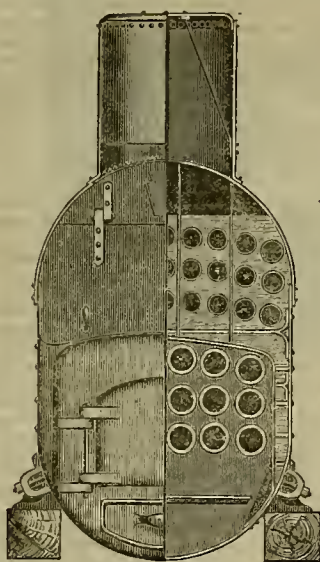
posits of the State. He will gather data concerning the oil resources of the various counties. The State Mineralogist himself is investigating the building stones of California.

As fast as these subjects are completed others will be taken up and the information which is gathered will be published in the annual reports.

This is a very important matter and it is to be hoped that miners will afford every facility to the representatives of the Bureau in making their investigations. They do not, of course, desire or expect any information of a private character which will be detrimental to the interests of any individual. In examining mines they do not wish any information which the owners desire to be withheld. As there are very few "stock operations" in the gold mines of California as there are in the silver mines of other regions, there is really no reason why most of the mines should not be studied. The information desired is of a general nature and for the general benefit of the mining community.

IMMIGRATION is increasing again, but the percentage of skilled labor as compared with unskilled that comes across the Atlantic is falling off.

SAMUEL BAXTER, one of the oldest hydraulic miners in Nevada county, died last week.



SECTIONAL VIEWS OF THE KEYSTONE PORTABLE BOILER.

turn flue boiler, the heat, which in the ordinary form of portable boiler passes up the stack, in this passes through a second set of tubes, heating the water and not the stack. As will be seen, the second set of tubes return above the crown sheet. It is thus apparent that a good depth of water is kept over the crown sheet, and that the crown sheet cannot be uncovered until after the water has fallen completely below the upper set of tubes. This crown sheet, in addition to being well braced, is arched, this form affording strength. The tubes through which the flames first pass are four inches in diameter; the second set are three inches.

The water space around the fire-box opens into a large water space below the tubes. The seam being inclined, the tendency of circulation is to carry any sedimentary deposits toward the water space below the tubes. This water space, being unaffected by heat, the water is quiescent, and opportunity is given for mud, scale, etc., to settle where no harm will result from their accumulation, and from which point this detritus can be easily removed. The crown sheet being the hottest part, the circulation is greatest at that point, its tendency being to carry with it, to the less active parts of the boiler, all impurities in the water liable to form a deposit.

A fusible plug is placed in the back head at low-water line, to melt out before the water

pressure. The boiler is neat in design, compact and complete, giving large power within a small space. It is rated at 10 square feet of heating surface per horse-power. It rests upon skids for convenient handling. The ash-box opening only in front, does not drop hot ashes and burn these away. These boilers are built in various sizes.

THE PLUMAS TROUBLE.—The District Attorney of Plumas county, C. E. McLaughlin, has published a statement denying, on behalf of himself and his fellow-citizens of Quincy, that any acts of violence in connection with the excitement prevailing there over the hydraulic mining question were either committed or intended, as has been stated. The fact that the miners held a meeting about that time is admitted, but it is insisted that the proceedings were orderly and peaceable.

At the Silver Star mine, in Smoky district, Idaho, a 20-stamp mill, with 16 Frue vanners for concentration of ore, an air plant and hoisting works, will be built at once, which will entail an expense of fully \$60,000. At the North Star mine, on East fork, a complete 10-stamp mill, with eight vanners, is to be put up at a cost of \$15,000.

In April, over 600 flasks of quicksilver were shipped from Napa county.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EBS.

Some Remarks on Geological Theories.

EDITORS PRESS:—In a former article commenting on one which you had published from Dr. Stillman's book, I cited some instances to show that the acceptance of speculative theories as demonstrated systems was not confined to the "ignorant multitude." The newspaper press is premeditated to embody and manifest the essence of the general intelligence and culture of any particular section of country. The frequent, I may say the habitual, use of the word "silurian" by the press of this city recently, in connection with the "dollar limit" controversy, implies an unquestioned acceptance of the geological system of this time, in the same way that the use, on other occasions, of the terms "natural selection" and "survival of the fittest" does that of the Darwinian theory of evolution.

The latter is based on the assumed truth of the former. The science of geology, as now taught, has for its basis the assumed truth of three cardinal principles, namely: the immobility of the ocean level, the instability of the land level, and the original existence of all aqueous rocks in horizontal strata.

In maintaining these principles, geologists are now placed in a predicament similar to that of astronomers during the reign of the Ptolemaic system. That system was based on the assumption that the earth was an immobile body occupying the center of the universe, having the sun, moon and stars all to revolve entirely around it once in 24 hours. The extreme absurdity of such an idea is now apparent to all persons of ordinary intelligence, yet that same idea held absolute sway in the scientific world for more than 1000 years immediately preceding the time of Copernicus and Galileo. During that period as the observations of astronomers became more exact, it became necessary for them to invent a system by which they might explain the apparent inferior motions of heavenly bodies distinct from the superior one around the earth. In this way they multiplied their "eccentrics, cycles, and epicycles" to such an extent that the study of the science had become a subject of inextricable confusion. Alfonso, King Astronomer of Castile, at one time remarked that "If the Deity had done him the honor to ask his advice before creating the world, he could have told him how to make it a little better, or, at all events, more simple." "He meant to express how unworthy this complication was of the dignity of nature."

Geologists of this time, like astronomers of the time in which Alfonso lived, instead of correcting false principles by deductions from newly observed facts, then reasoning constantly, aim at twisting facts into conformity with assumed principles. For instance, they have assumed that granite is an igneous production—first formed of all the rock—the backbone of the earth. Furthermore that there have been deposited on the granite everywhere a uniform system of aqueous formations, numerous, distinct and identifiable, amounting in the aggregate to an average thickness of about 10 miles; therefore, when in any particular region the upper portion of the series according to their classification is wanting, in order to maintain their principles, they resort to the expedient of assuming that the missing portions have been removed by denudation. In his Voyage of the Beagle, Darwin says: "Throughout the coast of Brazil, and certainly for a considerable space inland, from the Rio Plata to Cape St. Roque, lat. 5° S., a distance of more than 2000 geographical miles, wherever solid rock occurs, it belongs to a granite formation. * * * Can we believe that any power, acting for a time short of infinity, could have denuded the granite over so many thousand square leagues?" This statement of Darwin's, presuming it to be true, proves either that the system of formations is false, or else that a depth of rocks, about ten miles in thickness over the extensive area specified, has been entirely removed by the action of water without filling up the adjacent sea. The latter proposition is a palpable absurdity. Geologists assert the impossibility of the land surface of the globe, having been, all of it, at the same time beneath the surface of the ocean, yet observation teaches that every explored portion of it has been at some previous time in that condition. They get over that difficulty by alleging that the different sections of the land have been moved up and down alternately, somewhat after the manner of seasaw. There is a surface formation which in geological parlance is termed "The Drift." It occurs on all explored portions of the earth's surface, whether it be in the tropical, temperate or polar zone. It was unquestionably produced after the land had attained the general conformation and elevation which exists at the present time. There is a difference of opinion among geologists as to whether it was produced while the surface was beneath the water or beneath a universal covering of moving ice not less than one mile in thickness; but there is one fact which of itself proves conclusively that it could not have been produced by such an ice covering. There are found in it numerous animal remains, the skeletons being frequently entire. Such a mass of moving ice must have ground to powder

everything of that nature beneath it. It presents everywhere such similarity of characteristics in all respects as to prove its contemporaneity in all parts of the earth, consequently the seasaw expedient will not serve here, for the water must have risen above all of the land, or else all of the land at one and the same time sank beneath the water, and subsequently emerged without change of contour. The latter is a mathematical impossibility, while the former is only a conjectural one. Then again there are found in the drift numerous fossils of tropical animals buried in polar regions, and vice versa, those of polar animals now buried in temperate regions. Geologists attempt to explain these facts by alleging a temporary change of climate, adapting it for the time being to the constitutional requirements of the animals then inhabiting there. But there is another fact not so conveniently adjustable to theory. There are found lying side by side in the same bone-bed fossils of the extreme polar and tropical animals. I have no knowledge of any geologist or paleontologist ever attempting an explanation of this fact, and I challenge any local savant to give a logical one, in consonance with the principles of geology as now taught.

JUSTIN CHENOWETH.

San Francisco, May 7th.

Gold in California.

(NUMBER 3.—CONCLUDED.)

[Translated for the MINING AND SCIENTIFIC PRESS from *El Minerio Mexicano*.]

"Gold in the hands of a tyrant gives vertigo to society before corrupting it. It is only when gold is gained under the auspices of light and of liberty that it is legitimate and profitable; because, then it is transformed into progress, moral and intellectual."—*De un manuscrito Chileno*.

It is very difficult to ascertain the

Etymology of the Word Gold.

We know that the Egyptians gave the name *orus* to the star of day, to which they were offering their devotions. The color and brilliancy of gold led them to believe that it was produced by the sun, and hence they gave the same name to the precious metal as they had given to that star. Transporting ourselves to Greece, we there find among that people the metal of which we are treating called *aurus* or *auror* (auros or auron)—hence *thesaurus*, or treasure. All the writers of antiquity speak of gold—it may be now in a page of history, and again in their innumerable anecdotes and pictures of customs.

What poet, in his inspired or ecstatic verse, has not transformed the curls of the object of his enchantment into threads of gold? Of what eloquent man has one not said that his words were of gold? In the Bible, passages are frequent which evince that gold was known to the Israelites, and that they applied it in a variety of ways. The Egyptians, the Indians, and the Chinese have possessed this precious metal since the historical period. Homer says that the Greek princes were served from dishes and vessels of gold. Diodorus relates that Jayes, saved by a sailor, gave him a crown of gold, and afterward had him beheaded. Pliny says that Demosthenes had a gold ring which contained a very active poison. Hernan Cortez assures us that the natives of Mexico possessed gold and made vessels with it, and adds, that the city of Cholula was celebrated for the manufacture of jewels. Gold, in those remote epochs was

Employed in Objects of Luxury.

And was applied to domestic uses as well as to the decoration of palaces and temples. It is beyond doubt that our ancestors received the most pleasing impressions from and committed the most horrible crimes for gold. The part, then, which gold has played in the first evolutions of humanity has been considerable, and only the indefinite modifications through which the glorious societies of the future shall pass, will limit or annul its influence in the customs which inexorable progress may impose.

The lands and the rocks are

The Treasure of Nations.

In them it is that gold is found intercalated, from the smallest particles to the largest pebbles or kernels. Gold has also been found in vegetable ashes. But if its dissemination is extreme in the terrestrial stratum, the points are few where its accumulation is sufficient for lucrative extraction, in the actual state of the sciences, of civilization and of the difficulty in obtaining capital. After all, but few are the nations that extract gold from their territories, although every one should be able to do so, and always with some profit. Gold almost always presents itself in nature with the same color, aspect, and properties that we know it in money, jewels, and other objects of use, social and domestic. The chemists and mineralogists have given the name native, to gold in that state. The native gold is far from being completely pure, and does not become so until it has passed through the crucible of the chemist, which deprives it of the impure substances that accompany it. In every case

Native Gold

Contains almost always a small proportion of silver which varies from 5 to 15 per cent. Pure gold is a little harder than lead, which is equivalent to saying that it is very malleable. Neither air, fire, nor water alter it. From these properties and conditions it has received the name precious metal. We have said that gold is not

altered by fire; we make that statement, however, as a fact which is verified under ordinary circumstance and not when chemistry unfolds all its forces and concentrates enormous quantities of heat on a single point. In fact, with a temperature of 1100° of the air thermometer, gold is fused, and is volatilized at more elevated temperatures than are known to us. Among the most

Interesting Experiments

Which Monsieur Deville, our eminent professor, and the discover of the principal properties of aluminium, has shown, is the sudden transformation into vapor of a piece of gold by means of oxygen and hydrogen gas under the blow-pipe. Gold, like platinum and iron, has the property of soldering without having been fused. We say that the precious metal in the earth is not found pure. Thus it is, that in Mexico, it is allied with sodium; in Brazil, with platinum, and in California with tellurium and iridium. One of the most surprising physical properties of gold, is, that it can be reduced to leaves so fine, that their thickness will reach 1,100,000 millionths. The ductility, or it may be the property, which the metals have of being reduced to slender threads, is seen in gold, that with one ounce, a thread 26 leagues long may be made. This yellow and brilliant metal, is, after platinum, the densest body known, being 19.5.

We have said that gold is

Found in the Sands.

The rocks and the earth in a metallic state and with its characteristic yellow color. Its species is determined by submitting it to the action of certain chemicals. Sulphuric, nitric and hydrochloric acids do not modify the state of the gold when the assay is made with one only; but if the last two be mingled, an *aqua regia*, as the chemists call it, is formed, to the action of which, if the gold be exposed, it will completely disappear. If to the regia solution of gold is added a solution of oxalic acid, or, better, a sulphate of protoxide of iron, all the gold is transformed into dust, and deposited. Although the gold so treated becomes lusterless, its color and brilliancy may be restored by friction.

The operations indicated are not to be confounded with, 1st, the yellow alloys; 2d, the pyrites of iron and copper; 3d, the yellow micas. Gold might be extracted from some bodies which form with other bodies in certain combinations, if those were abundant. Unfortunately, this seldom happens, and it may be said that outside of the pyrites of copper and iron, generally decomposed by atmospheric agents, the other auriferous minerals present many difficulties when an effort is made to deprive them of the gold they contain. The magnetic and

Aureolical Pyrites

Are sometimes very rich, but hardly yield 30 per cent of their gold. Upon this question of the auriferous and complex pyrites, the metallurgists have made innumerable assays, with the object of an easy and economical method of extracting gold; but the attempts have not compensated their efforts in a satisfactory manner. In Hungary, a case has resulted in an arseniuret of iron calcining the metal, and a current of chloride being worked afterward upon the product obtained, the chloride of gold formed was immediately dissolved in the water, and finally from this solution the metal was precipitated by sulphureted hydrogen; but the problem has not been completely solved. We learn, however, that in the United States efforts are being made to apply this method. In the School of Mines of Paris they are likewise engaged. The galenas are other sources from which gold is drawn in certain cases; but its extraction is best effected by indirect operation. Thus, that which is most frequently done, is to melt them, in order to separate the lead, which is almost always argentiferous; afterward, the refining isolates the silver and the gold; lastly, by nitric acid, and at present by sulphuric acid, the silver is dissolved and the gold remains completely separated. A mixture of marine salt and any flux whatever may be employed in place of the acid, which, being put in a crucible with the alloy of gold and silver and submitted to a high temperature, leaves the gold on the bottom, and the silver is converted into chloride; from this chloride the extraction of the silver is easy by means of mercury and by direct fusion if desired.

MONTANA AND MICHIGAN COPPER.—In an article commenting on a statement in the *Marquette Mining Journal* that the Anaconda Company were to build a \$2,500,000 reduction plant at Duluth, the Butte (A. T.) *Inter-Mountain* has the following paragraph: But there is a lesson conveyed in this tirade of the Michigan copper organ, and it is this: There is going to be a long and costly conflict between the Michigan and Montana producers. It may be a conflict wherein only the fittest will survive. In this view of the case every consideration of self-interest points to the fact that the labor and capital of Butte have a mutual interest in making the fight to win. With a hold and solid front the common enemy must be met. There will be plenty of time afterward to settle personal differences. The workmen of Butte are just as directly interested in the outcome of the battle as are the men who own the copper mines and smelters. It is evident that the Butte companies have no connection near or remote with the Duluth enterprise. Such a scheme would be at once destructive and idiotic. The war, if war there is to be, is between the Butte and Michigan producers, and

the battle-ground in each case will be at home. It will be a contest to the finish, if that is the way the peninsula people want it, and it seems they do. The Butte forces are now well-equipped with abundance of ore, snapper machinery and a fair market. Our troops consist of 3000 stalwart miners, full of industry and hope, and with a loyalty to the home cause which no discussion can impair. Upon these troops depends the issue. Their interests are identical with those of the employing class, and when the Boston millionaires undertake to run them out and capture the market they will find foes far more than worthy of their steel. If the war is inevitable, let it come.

The Mining Outlook for Calico District.

Deputy Assessor H. B. Stevens, while visiting the mines to assess property, says the Calico *Print*, has had an excellent opportunity to ascertain the general condition of the camp, and, being familiar with every part of the district, owing to his extensive experience in prospecting and mining, his opinion of the outlook of the camp is important and reliable. He says that there are about as many miners, and probably a few more, employed in the camp, including the mills, as there were a year ago, before the King mine closed down. There are not quite so many employed in regular mining for the companies, but the deficiency is counterbalanced by a larger number of chloridiers than were engaged one year ago. Considerable progress has been made in the camp during the past year, and the outlook is brighter than ever. West Calico has made rapid strides, and several mines are coming into prominence. The group of mines, of which the Waterloo is the center, has given indisputable evidence that it contains a vast amount of mineral that will yield large profits to its fortunate owners, and for years will be one of the principal supports to Calico. The Barber Company is making thorough and considerable developments in the Total Wreck group of mines, and it is their intention, as soon as they extract efficient ore to warrant it, to erect a smelter near their mines, and if the present appearance of the mines continues, the works will be built this fall. There are a number of mines in Calico and adjoining districts to keep a smelter in constant operation on haec ores, including the Cleveland, which appears to be a veritable mountain of silver and lead. In fact, that portion of the district called West Calico, which is bounded on the east by the deep and tortuous Wall-Street canyon and on the west by the valley, is a prominent ridge two or three miles long, which is a vast deposit, or rather, innumerable deposits, of gold, silver and lead, which will require hundreds of men to extract its immense wealth, and scores of stamps and a large smelter to reduce its ores.

Considering the amount of prospecting done on this mountain ridge, the showing is splendid, and there is sufficient evidence to warrant the belief that the grandest results will follow the efforts of skilled labor, directed by enterprising capital. The group of mines on the well-known mineral belt between the Bismarck and Garfield anyone are in a most flourishing condition, new finds and new strikes being made almost daily. The mines in the Garfield and Silver Odessa groups have attained considerable depth, and are honeycombed with thousands of feet of drifts, tunnels, winzes and shafts, and keep 30 stamps dropping almost incessantly. The forces of man are being continually increased and developments progressing with greater energy than ever before. Such mines as the Comet, Pinto, Little V, Invincible, Bismarck and Home stake are attracting unusual attention on account of the numerous and frequent rich strikes that are being made by the chloridiers, and a score or more of men who recently commenced mining with only a grub stake are now the happy owners of thousands of dollars, and their energetic labors have exposed to view many thousands of dollars more of ore, and elevated to a position among paying mines properties that were a few months ago considered prospects of a dubious value. The chloridiers delving in the sides of the King mountain and those east of Garfield canyon are meeting with success, as a general rule, and are swelling the hullion output to a considerable degree. The splendid results now being accomplished by chloridiers are due to the experience that many of them have had in mining the peculiar kinds of rock prevalent in the district. Before they became familiar with the nature of the various formations, failures were the rule and successes the exception; now the order is reversed, and the skilled, experienced and business-like miner never fails to make good wages and often a handsome stake.

ENJOINED FROM SELLING WATER.—Thomas Cloke, administrator of the estate of John P. Hickey, deceased, to which the Cedar Creek Canal belongs, which supplies a portion of the mines of the Dutch Flat district, Placer county, has been enjoined from selling water for mining purposes, when it is to be discharged through nozzles. The effect of the injunction, if it holds good, will be to prevent all gravel mining in that section, not even permitting the use of hydraulic nozzles in cleaning bedrock, which is not hydraulic mining in the sense understood by miners. A case will be made on this injunction which will be carried to the Supreme Court of the State.—*Grass Valley Union*.

Carpenters Here and Abroad.

We gave, in a late issue, some account of the differences between the condition of shoemakers in this country and those of Europe. We give below a similar comparison between the carpenters in the two localities, obtained from the same source:

The carpenters of the United States enjoy a great many privileges unknown to the European artisans, and occupy a social position much higher than do their English cousins. It is a poor carpenter in America who cannot make three dollars a day, while abroad finished workmen hardly get that sum a week. A comparison of the carpenters of the United States and the carpenters of London serves to show how much higher in the social scale are the American workmen.

There are about 20,000 men in London who make their living as carpenters and joiners. Of these, nearly 5,000 are inexperienced workmen, and are not allowed to belong to the various trades organizations, toward which the spirit is very strong. There are two large trade societies in London. The Amalgamated Society of Carpenters and Joiners is the larger, and at present is composed of 3,000 members in London and 26,000 in other places in the kingdom. Next is the General Union of Carpenters and Joiners. This union has 1,000 members in London and about 6,000 throughout the kingdom. Thus it will be seen that only about one-third of the workmen are trade-unionists, partly because the unions are for insurance as well as for trade purposes, so that age and other restrictions keep out many who are in sympathy with the union. Expert carpenters in London do not get half the wages of American carpenters. There are few carpenters here who will work for less than 30 cents an hour; there are equally few in London who get more than 18 cents an hour.

The regulation hours and pay—that is, 52½ hours a week, at 9d. an hour—are quite generally enforced all through London, although some few firms get more and give less. Uniform pay has brought out another class of carpenters who are not benefited by the uniformity. These are the unskilled workmen, who are paid all the way from 3½ to 7½d. an hour. There are very few apprentices in London, as neither masters nor men like to be bothered by having them around. This system has not yet forced the importation of German skilled mechanics, which importation must in time necessarily follow, as it has in other trades in which apprentices have been done away with.

The social condition of most London carpenters is deplorable. Few have any means at all of comfort or enjoyment, and, more than that, there is a lamentable lack of the necessities of life. They live, ordinarily, in a few rooms, for which the rent averages from \$2 to \$4. Taxes are paid by the landlord. To help out, the children are put to work as soon as old enough, and sometimes as much as \$10 a week is added to the family purse by this means. These families ordinarily breakfast on bread and butter and tea. Dinner depends largely upon the estate of the family purse.

In hard times all money must go for food to keep the man strong and well, so that the wife and children are frequently obliged to make all their meals of the same monotonous diet. The carpenters, when working right along, make about ten dollars a week, but out of this sum must come reductions for the 16 compulsory holidays that occur during the year; they, however, average about six months of work. Of course, some carpenters save money, and eventually become foremen. Some keep a small store in connection with their trade, and thus accumulate money. On the other hand, some sink into utter wretchedness, thus making the average condition lamentable.

The Parisian carpenters are much more intelligent, and their social condition is much higher than that of the London carpenters. Their number is daily decreasing, owing to the introduction of bronze and metal cornices and other constructions that were formerly made of wood. The tendency is very strong for secret societies. The most important is the fraternity of *Compagnons du Devoir*, or *Compagnons Passant*. The different degrees of the order are designated by the names of animals, such as the wolf or dog.

There are no engagements between the workmen and the bosses. The *patron* can dismiss his workmen at any time he pleases without any notice whatever, and the workman can put his tools on his back and knock off work also at any time without giving notice. However, when the *patron* dismisses the workmen he must pay the latter the entire day's wages for the day of dismissal.

Wood is so dear in France now that a builder can import his doors and sashes from Germany cheaper than they could be made at home. The carpenter lives decently, however, and while much below the plane of the American mechanic, he is much above the London workman.

Probably the best situated workman as regards work and wages, and the most discontented and distrustful of all, are the German carpenters. Most of them are socialists, and on elections they vote solidly for the red candidates. As there is considerable building going on in Berlin now, there is plenty of work and wages are fair. They live comfortably as a rule, although some of them are in poor circumstances. The average German workman is not happy unless he has at least one strike in a year, and more are frequent. Political trades unions have been suppressed by the Government, and now the majority of carpenters belong to the great Carpenters' Association, which numbers more in membership, probably, than any other existing trade union.

WORKING ORE BY THE RAE PROCESS.—Mr. Wm. A. Rulison, superintendent and assayer for the J. M. Douglass mill, at Dayton, Nev.



SCENES IN THE GRAND CANYON OF THE RIO GRANDE.

ada, writes us as follows: We have just completed a run of nearly 15 tons of ore from the Hindley mine, Garfield district. The ore was roasted and chloridized. We used 101½ pounds quicksilver and received 1008 pounds back, showing a loss of 3½ pounds of quicksilver on the run, which is about the amount which would necessarily be lost in handling that amount of quicksilver over as many times as the above was handled. The usual loss by the old method would have been from 30 to 35 pounds.

ENGLISH COKE has been scarce for some time, and not long ago the price was advanced to \$22.50 per ton. This attracted shipments from Tacoma, which sold at \$16 per ton. Following this were fresh importations of English, and the market dropped to \$16 to \$17. This will be good news to Pacific Coast smelters, most of whom use this English coke.

THE four-masted ship Ocean King sailed for San Pedro from Nansimo April 27th, with 4,000 tons of coal, the largest cargo ever taken from British Columbia.

THERE is quite a little excitement up around Sierra City. The Young America and Sierra Buttes mines are running full-handed and doing well.

The Decay of Canals.

One by one the great canal systems of the United States succumb to the competition of the railway and locomotive. They served their purpose as channels of internal commerce successfully for a time, but their period of real prosperity was short. Scarcely had the Erie canal, which was the first and most successful of these artificial water-ways, been completed, furnishing a commercial highway between the seaboard and the rapidly developing West, says the Philadelphia Times, than George Stephenson's Rocket demonstrated that the iron railway was to be the highway of the future, and the ambitious and expensive canal enterprises which followed close in the wake of the Erie canal were scarcely completed when they were found to be of little more utility than the stagecoaches and freight wagons they had them-

ground was finally broken, the President himself, with coat off, in true American style, thrusting the first spade into the earth at the opening ceremonies on the Fourth of July of that year. The work progressed more or less vigorously for a period of 22 years, the canal being finished in 1850, at a total cost of \$11,000,000. At first it was profitable, being the only outlet for the Cumberland coal. But soon the Baltimore & Ohio railroad was built, through its more perfect eastern and western outlets, to deprive the canal of its profitable monopoly of the coal-carrying trade, and its prosperity began to wane. It suffered still farther from the corruption and wastefulness attendant upon political management. From these combined causes it has got in such a bad way that its president, in his last annual report, says that the canal cannot be longer continued without aid either from the State of Maryland or the General Government.

The last resort of the owners and projectors of outdated and unprofitable canals, whether State or corporate, is to appeal to Congress to take the bankrupt concerns off their hands and spend untold millions in the impossible attempt to make them profitable once more. Congress should resolutely decline to do anything of the sort. Water won't run up hill, and the old-fashioned canal will not compete successfully with the modern railway. The impossible has been performed. It is better to let the canals succumb to the fate of all outdated and unprosperous enterprises at once than to spend no end of money on them only to learn at last that they belong to a past era, as they undoubtedly do.

In the Canyon of the Rio Grande.

Readers who lately passed over the "Sunset Route" may recognize in the engravings on this page scenes which delighted them in ronts. It may be that the water fowl and the grand old huck did not appear; such features of a landscape do not generally materialize when most wanted, and the reader must take the artist's testimony as to their existence. There is enough, however, in the engraving to show that the scenery in the canyon of the Rio Grande is worth a journey to sea. The mouth of this canyon is in Texas, about 750 miles westward from New Orleans. Major Ben. Truman, in his book, entitled "From the Crescent City to the Golden Gate," speaks very highly of the beauty of the river, which is the geographical boundary between the United States and Mexico. At one point he speaks of the canyon being bounded with vertical limestone walls on each side, from 250 to 300 feet in height, and the tourist is treated to a scenic and engineering paradox of traveling a long distance up the river on a down grade. Two miles further west, the train enters a tunnel 1426 feet in length and 75 feet above the water line, emerging from which it moves along for several miles upon a wonderful piece of shelving out of the great limestone bluff overhanging the river and about 60 feet above it. This is pronounced by Major Truman one of the grandest pieces of railroad travel in the world, and is very beautiful and very impressive for quite a distance. The engravings give some idea of the startling and beautiful features of the railway construction and the scenery.

Academy of Sciences.

Dr. Harkness presided at the meeting of the California Academy of Sciences on Monday evening. George J. Ainsworth was proposed for resident membership. Edward L. Greene read a very interesting paper on "The Flora of Santa Barbara Channel Islands."

Dr. George Hewston read a paper "On Sponges," which was illustrated by the aid of the stereopticon.

F. L. Clark, who accompanied the party of Queen Kapiolani to this city, and who has resided for 20 years in the Hawaiian islands, illustrated by means of a stereopticon a number of views of the ancient Hawaiian temples and idols that existed and were worshiped at the time of Captain Cook. These series of photographs have been presented by King Kalakana to the Academy of Sciences. Fac-similes of these photographs will be sent to the leading scientific societies of the country. There are over 200 photographs in the collection, and they are of great historical value.

The president read a brief statement to the effect that Miss Haggin and Mrs. Hanson had made a collection of fresh-water algae in Lake Tahoe. These specimens had been sent to Francis Wille, of Pennsylvania, an authority in such matters, and he has reported them to be splendid specimens. He said he had been trying for 10 years to get samples of California fresh-water algae, and was extremely gratified to have at last succeeded.

THE Calumet and Hecla Copper Co., of Lake Superior, is said to have made contracts with all large consumers in the country for six months' supply. This will involve 25,000,000 to 30,000,000 pounds. The price was 10 cents per pound, making the value of the transaction from \$2,500,000 to \$3,000,000.

A SAN FRANCISCO COMPANY, known as the Junction Company, is to carry on operations on the Gold Belt, near Hailey, Idaho.

selves superseded. The record of the decay of Pennsylvania's system of State canals, which had entailed a debt upon the commonwealth of upward of \$40,000,000, has already passed into the realm of ancient history. The State of New York has been compelled to make the Erie canal, with all its wonderful natural advantages, toll free in order to save it from abandonment. Scores of less important private and State canals have dried up and been forgotten by the present generation.

The latest important canal to become a candidate for inevitable bankruptcy is the Chesapeake & Ohio, of Maryland, which extends from Georgetown to Cumberland, following the north bank of the Potomac river for a distance of 184 miles, and tapping at its western end the famous Cumberland coalfields of Western Maryland.

This canal has a most interesting history. Its projector was Washington, who, long before De Witt Clinton had made himself immortal by projecting the Erie canal, had conceived the idea of connecting the waters of Chesapeake bay with the Ohio river by means of a canal. During his lifetime a company was formed for this purpose, of which he was president. But Washington died before any real work was entered upon in this direction. It was not until 1828, during the last year of John Quincy Adams' administration, that



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Passing Events.

The dreadful disaster in the coal mines at Nanaimo is the worst that has ever been experienced on this coast. We have been particularly free from mining disasters of magnitude, and especially in the coal regions. The loss of life was very great, as the account in another column shows.

All over the State improvements of every kind are in progress. Not very long ago civil engineers were very short of work, but now their services are in demand and all in the profession are busy.

There is just now a sort of "hoom" in sewers. Most of the larger cities are following the example of San Diego and giving careful attention to the sewerage systems. Those which have none now are planning them, and those which have old ones are improving and altering in accordance with modern ideas of sanitation. Much of this is due to the presence on this coast of Col. Waring, the distinguished sanitary engineer.

The Mining Bureau has this week started assistants into the field for the purpose of obtaining practical information which will be of benefit to the mining community when published.

ADVICES from Boston say that the new explosive, melinite, is useless for war purposes, as it decomposes if kept long.

Why Mines Are For Sale.

Why mere mining claims or locations on which little or no work has been done should be offered for sale is no mystery; but why the owners of mines that have been opened, equipped with plant and brought into a profitably productive condition should be seeking buyers for these properties is, to the uninitiated, matter for wonderment. And yet even this is easy of explanation. It often happens that the owners of these outfitted and producing mines own also undeveloped claims in the neighborhood, sometimes a number of them. In the value of these claims they have such confidence that they would be willing to spend money in opening and testing them if they had or could procure it for that purpose. These claims, so long as they remain unprospected, are valueless, as they cannot in that condition be sold, and, instead of yielding any income, are a constant tax on the owner, who, unless they are patented, is obliged to expend at least \$100 upon each one of them annually. With the proceeds arising from the sale of one producing mine, it would be possible to open up two or three of these claims and perhaps develop in each of them large values. Hence the desire so often manifested by this class of proprietors to sell what the English call a "going" mine.

Again, it may happen that a man, having spent a great many years building up a profitable mining property, is anxious to get out of the mountains and take up his residence where he can for the remnant of his days enjoy more of the comforts and luxuries of life, to which end he may be willing to dispose of such property at a sacrifice. There are cases, too, in which impaired health or severe hurts received, incapacitating men for labor or further usefulness in the mines, may predispose them to sell a profitably producing mine at a bargain.

As regards the great masses of miners, more especially the class known as prospectors, they make it a part of their business, and in many cases their sole business is to take up and hold mines, or rather mining claims, for the purpose of selling them. On these claims they are apt to do no more work than is required to hold them, though they are to be found in all stages of development. Not only so, but they possess every degree of merit. Some of the veins are large and some small, some rich and some poor. As these deposits vary in promise, so do they vary in the prices asked for them, these prices being largely dominated by circumstances, often by the mere whims of the owner.

The men who discover mines are for the most part practical miners or professional prospectors. Their capital consists of their labor, enterprise, and capacity to endure exposure, hardship and fatigue. Going out into unexplored regions, they find mineral deposits which they take up and hold, doing thereon only enough work to keep good their possessory title to them. This as a rule is all they are able to do, and is all that the most of them ever propose to do, their object in locating these claims being, as before remarked, to sell, in fact, the means to do this.

When rich or even tolerably good ore is found at the start, the miner may be able to not only thoroughly prospect his claim, but bring it into a state of active production. But such occurrence of ore rarely happens. Generally much costly deadwork has to be done before any considerable body of pay ore is reached. If the mine is to be exploited by adit, this from the commencement is an expensive business. If by shaft or incline, this too becomes expensive as depth is reached. When pay ore in quantity is developed, then a mill or other style of reduction works must be put up; all of which involves an expenditure far beyond the common miner's means. There is left him, therefore, no alternative but to sell his claim for the most he can get for it. Hence the many properties of this kind seeking purchasers, some of these properties possessing values that ought to recommend them to investors.

The qualifications that make a successful prospector do not always make a good business man or even a good practical miner. A first-class prospector requires to be constitutionally sanguine and hopeful. If trusting and venturesome and even disposed to be a little visionary, this does not detract from his fitness for such

calling, however much these peculiarities might disqualify him for carrying on a business in which careful calculation, cool judgment, system and attention are essential to success. A consciousness of his deficiencies in this respect has, no doubt, much to do in determining the prospector to sell rather than work his mines. In adopting this plan he does not conform to that subdivision of labor which in every branch of business has been found economical. The farmer finds it to his advantage to sell his wheat to the miller instead of converting it into flour himself. The grape-grower disposes of his vintage to the wine-maker, the cattle-raiser sells his hides to the tanner, and so of numerous other industries in which the producer of the raw material makes a gain by transferring it to other hands to be converted into marketable shape. The virgin mine is the raw material of the claim-locator and the prospector, which being unable to work themselves they desire to sell to the capitalist and the skilled miner.

Local Industrial Exhibition.

In view of the fact that many strangers and visitors are now thronging to California it is the intention to have the next exhibition of the Mechanics' Institute in this city of a more thorough character than has been the case. A meeting of representative citizens was held at the Institute on Tuesday last to consider the best means for receiving a suitable and proper representation of the products and resources of the State. It has been acknowledged that former exhibitions were more or less local, but this time they desire exhibits from all over the State. A large number of prominent citizens attended the meeting and the subject was thoroughly discussed.

A. P. Williams offered the following preamble and resolution, which were unanimously adopted:

WHEREAS, A large immigration of desirable people is now pouring into the Pacific States and Territories, and unusual attention is being given to California, her productions, capabilities and advantages as a place of residence; and,

Whereas, The citizens of San Francisco, the natural center of trade and commerce on this coast, should unite in an effort to secure a fair share of attention to this coast and State, and no better way of advertising the advantages of our State and displaying her resources and capabilities, and, at the same time, an example of the commercial supremacy of our city, can be suggested than to hold, during the coming autumn, a comprehensive exhibition of the products of our city, State and coast; and,

Whereas, The Mechanics' Institute has made arrangements to hold an industrial exhibition in this city during the months of September and October next, and proposes to divide \$30,000 to \$35,000 for the expenses thereof and for extra attractions and decorations, and as it is of interest to all our citizens, property-owners and merchants, that an effort should be made to hold in this city a more comprehensive exhibition than has yet been attempted by the Mechanics' Institute; therefore be it

Resolved, That the Chair appoint a committee of 12 representative citizens, who shall take measures to make the coming exhibition more attractive and comprehensive than any heretofore held on this coast, and that the said committee have full power to do all things necessary to that end, including the fixing of premiums, and collecting and disbursing of money for that and other purposes.

Chairman W. T. Garratt announced the following names, selected to serve on the committee: Wm. T. Coleman, F. W. Sharon, A. S. Hallidie, Adolph Sutro, A. P. Hotaling, J. B. Stetson, J. M. McDonald, J. Mervyn Donahue, N. Van Bergen, A. J. Bryant and B. P. Flint.

The Colliery Disaster at Nanaimo.

The most disastrous mining accident that ever occurred on this coast was that of the explosion in the coal mine at Nanaimo, B. C., by which upward of 150 miners lost their lives. The real cause of the explosion is not known, some attributing it to fire-damp and others to fine coal dust. The lost miners were natives of England, Scotland, Ireland, Nova Scotia, and a few were Americans and Chinese. Most of the bodies have been recovered, and though many were killed by the explosion itself, most of them died from the effects of the after-damp, as is shown by the condition of the bodies. Some of the men wrote on the timbers in the mine, showing they were alive many hours after the explosion occurred.

A fire broke out in the air shaft after the explosion, and considerable valuable machinery was destroyed. Rescuing parties entered the workings as soon as possible, but it was impossible to save any of the men in the mine. Great distress prevails among the families of the dead miners, and subscriptions are being raised for their relief. This city has eul-

scribed a goodly sum, two principal mining men, Messrs. Mackay and Flood, heading the list with \$1000 each. The other mines closed down in the vicinity, and the men formed rescuing parties. Business at Nanaimo has been completely stopped for a week.

Alaska and Its Mines.

When Alaska was first purchased it was supposed we had made a very bad bargain, but we have since found it to have been a good one. The seal and salmon fisheries alone are worth more than we gave for the whole region. The timber resources are immense and will be utilized in time. The gold mines are only beginning to be found, but those which have been developed are yielding well. One mine alone, on Douglas island, is sending down \$75,000 to \$80,000 per month in gold bullion.

There is now some talk of making Alaska a penal settlement for the United States. It seems odd to even suggest the largest Territory we have for such a purpose. Yet many people here are rather pleased at the idea and speak well of it. If the United States should ever adopt the policy of penal settlements, which is very doubtful, it would take as many men as there were prisoners to keep the latter there. With an extensive seacoast and a practically unexplored interior territory abounding in rivers, there would be so many opportunities for escape that the experiment would be doubtful. The sea-coast climate is milder than many places on the Eastern coast in winter, and while the interior is very cold at that season, in summer it is extremely hot. Those who have resided there do not speak unfavorably of the country other than it is isolated and thinly inhabited.

It is probable, however, that in the next few years more mines will be found in that region, and it will be so much settled up that any idea of a penal colony will be abandoned, even if it is seriously entertained now. Any country that can show one such mine as the Treadwell is apt to show others equally valuable. The ore there is not high-grade, but there is an abundance of it. The mine is equipped with one of the best gold quartz-mills in the United States. It has both water and steam-power. The other day \$80,000 in gold came down for the April product. Another enterprise, the Union Company, of Boston, is proceeding with the erection of its machinery on Douglas island. The water supply is abundant. Steam is shut down for the season. Four roasters are running night and day, treating sulphurets.

The owners of the Berner Bay property sold three mines last week for \$30,000. Good ledges are reported located in the Silver Bow basin.

Then the Yukon and Stewart river placers are still to be heard from. Wonderful stories came from the Yukon last fall, and several hundred miners have gone from California, Oregon and British Columbia to that region, as well as several hundred more from the Juneau (Alaska) region. Altogether, for a new and unprospected country, the mining prospects of Alaska are bright. A few good placer camps on the Yukon would alone bring several thousand experienced miners into the Territory, notwithstanding the short mining season due to the long winters.

THE EARTHQUAKES.—Very severe earthquakes occurred last week in Arizona, New Mexico and Northern Mexico. It was at first reported that volcanoes had broken forth, but these reports lack confirmation. No very great damage has been done. There are the usual cracks in the earth, new springs, etc., accompanying severe disturbances of the kind. The United States Geological Survey has taken immediate action for the purpose of the collection of valuable information regarding the recent earthquakes in Arizona. The plan is to send letters of inquiry, with pointed questions, relative to the exact time the shocks were felt, their duration and any other particulars which give an idea of the intensity of the shock, the apparent direction in which the wave traveled, the accompanying sounds, the effect on springs and wells and the contour of mountain ranges, etc. Great reliance has been placed upon voluntary assistance, correspondents, newspapers, etc., in the disturbed area. Such assistance resulted, in the case of the Charleston earthquake, in the accumulation of an immense amount of valuable data.

The New Navy and Coast Defenses of the Future.

On Thursday of last week the first annual banquet of the Chamber of Commerce of San Francisco took place, and there was a large gathering of representative citizens. Wm. L. Merry, president of the Chamber of Commerce, presided. Speeches were made in response to toasts by General O. O. Howard, Mayor Pond, W. W. Morrow, C. N. Felton, Horace Davis and Irving M. Scott. Mr. Scott spoke to the toast of "The New Navy and Coast Defenses of the Future," and his remarks were of great general and local interest, we give them in full as follows:

Mr. President and Gentlemen of the Chamber of Commerce: In attempting to respond to this toast, permit me to say, if the Chamber of Commerce were the Chamber of Congress, the wants of the Pacific Coast would be fully supplied, and her interests protected in every respect.

Therefore, let it be the duty of this Chamber to weld into a solid phalanx all the interests on this side of the continent, and marshal them to reap the harvest which modern progress is preparing for the brave of heart and vigorous Saxon of our day.

Great Britain and Ireland have 120,832 square miles of area, and a population of 35,241,482. California has 168,000 square miles of area, and at the last census, the United States has 55,000,000 of people. Now move this entire population within the border lines of California and you will have less people to the square mile than now live in England. By the courage and faith of her sons, England's power has circumnavigated the globe, and her flag greets the sun on his daily journey in every clime.

With more and varied land, with the sons of pioneers, it is possible for this coast to support a population which will discount any colony that England has yet planted. The Pacific ocean has 67,800,000 square miles of area. It drains 8,600,000 square miles. America has a coast line of 1200 miles on the Pacific, and 3000 miles on the Atlantic, and 2200 miles on the lakes; 5,201,175 of people dwell on these waterways, whose cities cost \$4,037,281,000, and whose annual manufactured product amounts to \$1,109,243,466. This is the field the navy of the future must protect. The commerce of this field is the enticing prize which awaits our merchants and which they must rescue from the hands of others. Can it be done? Let us compare the relative cost of water and land carriage.

The Burgos left China with a cargo of 5,600,000 pounds from Plymouth to Alexandria, a distance of 3380 miles. The consumption of coal was 282,540 pounds, or 83.5 pounds per mile, or $\frac{1}{3}$ ounce of coal per ton of freight per mile. Speed 10 miles per hour. The Aherdeen, a sister ship of 5000 tons, makes 10 miles per hour with a consumption of 18 tons of coal per day or $\frac{3}{4}$ ton per hour, or 9-16 of an ounce of coal per ton per mile. Both engines are of triple expansion type, carrying 160 pounds of steam. The Burgos could bring 2800 tons of freight to this port from New York in 60 days, on less than 600 tons of coal. She could coal at Rio on the Atlantic and at the coal mines of Lota on the Pacific, thus reducing her non-paying cargo to a minimum.

The best authentic record of any locomotive is two ounces of coal per ton of freight per mile at a speed of 13 miles per hour, including stoppages, and where the grades are from 55' to 70' per mile, the consumption of coal is five ounces of coal per ton of freight per mile. This then is the competition which has been so skillfully managed that it has absorbed our ocean trade. Merchants of San Francisco, with the expenditure of less capital, with less energy than the artificial ways of trade have required to construct, all this commerce can be yours; reach out for and secure it, turn its volume through this city, our city, and enrich every calling in it.

The war of 1812 found the most efficient weapon to be a 42-pounder, 10 feet long, weight 4 tons, using 10 pounds of powder, to a charge of shot weighing 42 pounds, and a muzzle energy of 300-foot tons.

In the war of 1862, the Rodman gun was 16 feet long, weight 20 tons, charge 130 pounds of powder, shot weighing 450 pounds, and a muzzle energy of 9000-foot tons.

The gun which confronts us to-day is 45' 6" long, weight 115 tons, charge of powder 850 pounds, shot 2300 pounds, with a muzzle energy of 55,000-foot tons. This gun, at a distance of one-half a mile, will penetrate 30 inches of iron, 24 feet of concrete masonry, or 75 feet of earth. This gun, rendered useless in the defense of nations, every fort built of masonry, brick or concrete, and left all coast defenses, except sandhogs and earth, as if they had never been built, and the pneumatic gun of Lieutenant Zolinski, with a range of two miles, its shell carrying dynamite, has changed the efficiency of those massive works of naval skill and science. The armored ships of war in Italy's navy, the Italia of 13,000 tons of displacement, with 18,000-horse power, armed with 4 guns, of 103 tons each, and protected with 19" of armor, would disappear as a bubble does when it bursts, should a shell carrying 400 pounds of dynamite fall upon its deck.

The forts of the future will be small holes in the earth, comparatively inexpensive, as compared with previous works of defense, protect-

ed, perhaps, with Gruson's cupolas of cast iron, fitted with disappearing cannon, which descend to load and ascend to fire, all embarked with sandhogs or earth. These guns will be operated entirely by mechanism, moved with compressed air. The navy of the future will be swift of motion, of great endurance, heavily armored and manned by the flower of American youth.

Our Christian warrior, in his plea to-night, asks, in the interests of peace and good government, for a substantial increase in the army. With such advice before us from so distinguished a source, it will justify a layman in asking for an increase for the navy—aye, a hundred-fold. Our new navy is now confronted with 2748 battle ships, employing 282,375 men, and costing \$181,422,875, and supplied with every appliance known to modern science. The navy of the future should be manned by the young, full of hope and courage. These men should be so equipped by knowledge taught in our schools as a necessary part of a liberal edu-

tempted a revolution at home. Then let it be the duty of this Chamber of Commerce to see that our nation so legislates in the future that the principles of nautical astronomy and practical navigation and use of cannon shall be taught in every State university, and that all institutions of learning now built and now being founded shall add to their curriculum this long-neglected art, and stir the hearts of coming Paul Jones, Decatur, Perry and Farraguts to emulate and excel historic records, and make the navy of the future the glory and pride of our nation as "we spin forever down the ringing groove of change" with the starry "banner full high advanced."

Tests of Materials.

The Department of Mechanical Engineering in the University of California has of late been doing some good work in testing materials such as iron, stone, cement, brick, etc., and is pub-

1. All specimens for testing must be in duplicate.

2. Every specimen must be prepared by the sender so as to conform exactly to the corresponding diagram to be selected from the annexed ten, having proper regard to the material to be tested and to the kind of test required.

3. A full and complete description must accompany each and every specimen. If metal, the character and place of manufacture; if stone, the locality where found must be stated, etc.; and in general the description must be full enough to make the test executed of public, and not merely of private, value.

4. The freight or expressage on all specimens must be prepaid.

5. All communications must contain the name and address of the sender, otherwise the application will receive no attention. All letters should be addressed and specimens marked, Department of Mechanical Engineering, University of California, Berkeley, Alameda Co., Cal.

All specimens will be retained by the Department for future reference. The results of the desired test will be forwarded to the party making the application, and may be published in the bulletins of the Department.

In order that those desiring to have materials tested may send their specimens properly, we take the cuts and instructions from the circular just issued by F. G. Hesse, Professor of Mechanical Engineering at the University.

In the accompanying cut, showing form of specimen for breaking or ultimate strength of metals, d =diameter of reduced section; d' = $d + \frac{1}{8}$.

The greatest admissible diameter for round specimens, beyond which they cannot be tested, must be taken from the table below:

TABLE FOR GREATEST ADMISSIBLE DIAMETERS AND AREAS.

NAME OF METAL.	Tensile Strain, Elongation, etc.		Crushing Strain.
	Greatest Diameter, Inches.	Greatest Area, Sq. Inches.	
Cast iron.....	1.00	.....	.62
Wrought iron.....	.87	0.60	1.00
Soft steel.....	.71	0.40	.....
Hardened steel.....	.65	0.53	.....
Cast steel.....	.63	0.27	.....
Cast steel, tempered.....	.63	0.22	.....
Copper.....	1.00	1.20	.95
Yellow Brass.....	1.00	2.40	2.00
Gun Metal.....	1.00	.77	.....
Phosphor Bronze.....	.90	.70	.....
Cast zinc.....	1.00	5.00	2.00
Lead.....	1.00	.....	2.00
Tin.....	1.00	.....	.....

For rectangular specimens the greatest admissible width, (see cut) $w=1\ 15-16"$. The area of rectangular reduced section must be taken from the table.

In the form of specimen for breaking strain, elongation and limit of elasticity in metals, the greatest diameter of metal to be tested depends on its character, and must be taken from the table.

The maximum width (w) of the flat specimens which can be tested with the apparatus is $1\ 15-16"$. For sec. a , refer to table. Three specimens are required for a thorough test of the above strains.

Wire of any diameter or gauge, irrespective of metal, can be tested; but triplicate specimens are requisite. (See cut for size.)

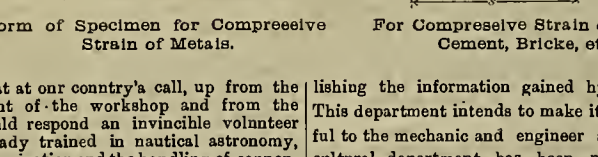
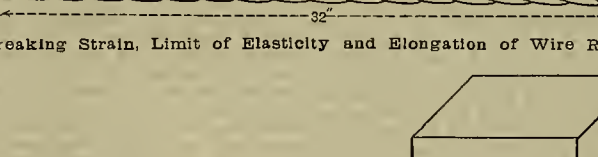
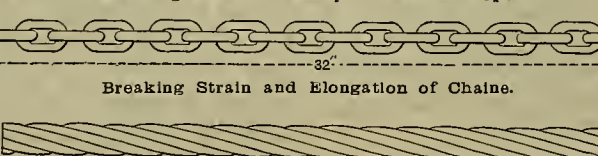
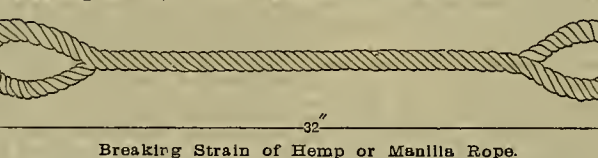
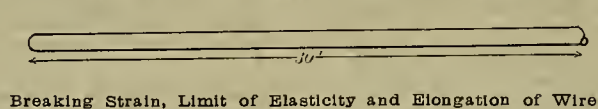
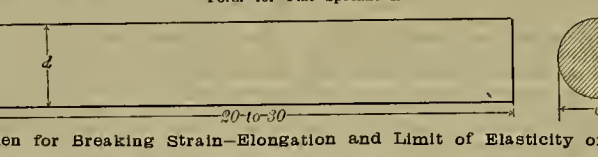
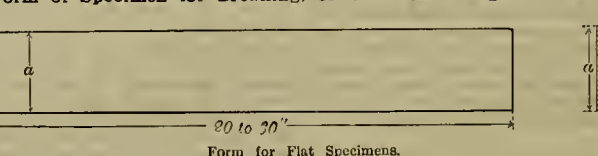
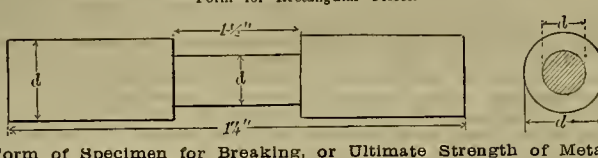
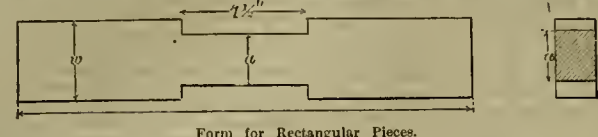
In the specimen to find breaking strain of hemp or manilla rope, the outside measurement, a , should not exceed two inches. Every specimen of rope must be so prepared by the sender as to correspond to above diagram. The loops on the ends should be well applied.

As to breaking strain and elongation of chains, the outside measurement of links must not exceed $1\ 15-16$ inches, in order that the chain may pass freely through a hole 2 inches square. Every specimen of chain must be accompanied by a rod 30 inches long, representing the material from which the links are forged and made. No chains, whether forged or made from flat iron and riveted, must be too large to pass freely through a two-inch hole.

As to the breaking strain, limit of elasticity and elongation of wire rope, no tests will be made of wire ropes having a greater circumference than three inches, and no steel ropes having a circumference greater than $2\frac{1}{2}$ inches will be tested. Three specimens are requisite for a thorough and complete test.

Length of each specimen for compressive strain of metals to be twice the diameter. The largest diameter possible for the specimen to be tested depends on its character, and must be taken from the table.

For specimens of hard stones, as granite, quartz, onyx, etc., the side, s , of the cube should not exceed $1\frac{1}{2}$ inches. For softer materials, as marble, limestone, slate, etc., bricks, cements, artificial stones, etc., the side, s , of cube ought not to be more than $2\frac{1}{2}$ inches.



cation, that at our country's call, up from the counter, out of the workshop and from the desk, should respond an invincible volunteer corps, already trained in nautical astronomy, practical navigation and the handling of cannon.

The Congress of the United States in granting land scrip to universities, requires military training as a recompense for the gift, and every State provides for a militia to form a nucleus in time of war, and the National Guard is a reserve from which the nation can recruit its army; but nowhere, except a few private schools in the principal seaport towns, are there any provisions for the education of the simplest elements of navigation or the handling of cannon.

Why is this? History records many incidents where the army, in spite of all the care fostered upon it, has revolted, overturned the government and created a new one. But, Mr. President, if I recollect aright, no instance is on record where the navy has proved false to the flag of its country, or ever created or at-

lishing the information gained by the tests. This department intends to make itself as useful to the mechanic and engineer as the agricultural department has been made to the farmer, and will issue bulletins as often as occasion demands.

They are now prepared to test materials for tensile and compressive strains, elongation and limits of elasticity. All tests which will yield results of practical value to the public at large will be made gratuitously, and the right is reserved to publish or exhibit the results. Tests will not be made when, in the opinion of the professor in charge, the object does not appear of sufficient importance to warrant the expenditure of time and labor. Persons sending or forwarding materials and specimens to be tested must observe the following rules:

MECHANICAL PROGRESS.

English Comments on American Tools.

London *Iron* says: "Our American contemporaries have every cause to be surprised at the astonishing fact that thousands of tons of scrap-iron are every year taken to the United States, and there converted into the simplest of American manufactures—the ead or landry-iron—and then exported back to Europe at no small profit. There is not one corner of Europe where American small cast hardware is not on sale. The toolmakers and machinists of Europe—such as Krupp, of Germany, Whitworth and Armstrong, of England, and Hotchkiss, of France, with their vast resources—are unable to produce a Monkey or screw-wrench equal to the American wrenches, and consequently they have to import these tools from the States. It is stated that there are no less than 80,000 dozen of them exported to Europe alone, every year. It is interesting to note that Charles Moncky, the inventor of this screw-wrench, received only \$2000 for his patent, and is now living at Williamsburg, Brooklyn, in a small cottage bought from the proceeds of this sale. In the matter of the common pocket box-wood rules, also, the American manufacturers so far excel all others that, if not all European nations, certainly all nations outside of Europe, are supplied from America. The manufacturers there print on the rule whatever system of measurement is followed by the country for which the goods are intended. American augers and auger-bits are used the world over, no other nation being able to compete. The Americans, with such facts before them, may well be proud of their manufacturers."

New Process for the Protection of Iron.

The problem of preserving iron from oxidation may fairly be termed one of the great issues of the present day. Hitherto it has been effected in widely opposite ways. One method has consisted in converting its surface into an oxide, another in applying paint or enamel, another in coating it with zinc. All these methods bear the aspect of being expedients merely, and do not present a definite solution of the problem.

Of all the ordinary metals, lead, which resists some of the stronger acids, such as sulphuric or hydrofluoric, may be regarded as the most durable. A new process for coating iron with an adherent layer of this metal has recently been discovered and perfected by Mr. F. J. Clamer, of the Ajax Metal Co., of Philadelphia. By it the iron is covered with a uniform coating of silvery lead. The roughnesses and indentations of the iron receive the lead, as well as the smooth parts. The result is a perfectly protected piece as long as the lead endures, and it is practically everlasting. No oxidation can affect the iron. It is especially adapted for the protection of sheet iron for car and boiler roofing, for spikes, bolts, nuts, pipes, hoiler tubes, water tanks, iron bridges, and wherever the protection of iron or steel, wrought or cast, is desired. Its cost is no greater than that of the ordinary zinc or galvanic process. The superior excellence of the new method, its comparative cheapness, and the wide range of its applications, mark it as one of the most important of recent improvements in the useful arts.

THE EFFECT OF HEAT ON METAL.—Everybody, observes one of our contemporaries, who has used the Brooklyn bridge, must have noticed the overlapping slides at the middle of each span, that allow the structure to grow short or long, as the weather grows cold or hot, and the marks thereon that indicate a distance of several feet between the extremes of contraction and expansion. Yet few suspect that the bridge contracts or expands sideways from the heat of the sun, though the degree is so small as to be almost imperceptible, and not nearly so great as if the bridge ran north and south. The same phenomenon has been noticed of late in structures of stone and iron. The Washington monument leans to the east in the morning and to the west in the afternoon. A plummet line suspended in the interior of the dome of the capitol at Washington was found by actual measurement to swing over a space of $\frac{1}{4}$ inches, making a total dip from the perpendicular of $\frac{3}{8}$ inches. This movement involves the entire dome. A learned monk, some years ago, suspended a plummet in this way from the top of the dome of St. Peter's, at Rome, and was astonished to find this mysterious movement. He attributed it to a third and undiscovered motion of the earth, but it was afterward explained as the effect of the action of the sun on the metal of the dome.

INFLUENCE OF TEMPERATURE ON THE STRENGTH OF IRON AND STEEL.—B. Papkoff gives in the *Russian Mining Journal*, an account of an extensive series of experiments on the influence of cold on the strength of iron and steel in various forms and under various kinds of strain, but circumstances obliged him to abandon his intentions after a few tests had been made. He thinks, however, that the results he was able to attain are worth being made known, because they seem to point to conclusions totally opposed to those generally received. All the specimens tested were taken from soft steel and iron plates, three samples

being cut from each plate. One sample of each group was tested at the ordinary and two at the low temperature. It was found that both the ultimate strength and percentage of elongation increased very sensibly with the decrease of temperature; the author remarks that such a result was to be expected, because the contraction caused by cooling has the effect of bringing the particles of matter closer together and consequently of intensifying the force of cohesion; but he also observes that a law which may be found general for strains gradually imposed may not apply at all when they assume the nature of shock or of impact.

STEEL INGOTS BY AN IMPROVED METHOD.—A company has been formed for the purpose of establishing a new steel works at Manchester, England. The company has the option of purchasing the right to a patent belonging to Mr. Thos. Hampton and Mr. John Facer for the manufacture of special steel ingots by an improved method, which consists in casting parallel ingots in groups in divided molds, in sizes varying from three inches square and upward, similar to the molds used in casting crucible steel ingots, and by which method it is stated the ordinary process of cogging and hilling is avoided. Mr. Thos. Hampton is to act as managing director and general manager of the proposed new company for a period of five years.

A NEW METAL INDUSTRY.—Kuhlow's says that in Germany gold, platinum and silver strips are welded, after the mosaic style, upon a metal ground, prepared by the incandescent process, then compressed by means of powerful presses, and finally elongated by rolling into long sheets or strips. These sheets, which are now of all colors—yellow, red, green, white, gray and black—are made into scarfs and neckties, which, being indestructible, are considered of some practical worth. This novelty, it appears, has found great acceptance abroad, numerous orders for export having been received by the manufacturers, who are chiefly in the Pforzheim and Baden districts.

HARDENING AND TEMPERING.—When a piece of metal requires hardening and tempering at one part only, heat the steel behind the part to be tempered to redness, and dip the article so as to harden the required part, and leave sufficient heat in the contiguous metal to raise the temperature of the hardened part enough to temper it. This plan is usually followed in the tempering of lathe and planer tools, flat drills, etc. If, however, the method of dipping is to hold the steel in the water at an even depth after the immersion, the temper color will be very narrow, while if the steel be raised and lowered in the water, the color-band will be broad.—*Builders' Reporter*.

NEW PROCESS FOR MAKING STEEL PIPES.—The new method of making steel pipe at Barbach, Germany, is said to be very successful, and the process of manufacture is briefly as follows: As soon as the steel is cast into the round mold a core is thrust into the steel, so that the tube is formed between it and the sides of the mold. In order to prevent cracking of this annular casting during cooling, the core is made up in such a manner that it follows up the shrinkage of the steel. The steel cups thus obtained may then be rolled in an ordinary train. It is stated that a large firm in Paris proposes to apply the method to the manufacture of copper tubing.

NEW PROCESS OF ANNEALING WIRE.—A new process of annealing wire consists in coiling the wire upon a hollow metallic core or drum, embedding the wire and core in sand or its equivalent, surrounding a central open space, subjecting the whole to heat with the wire thus embedded, and then allowing the whole to cool before removing the wire from the embedding material. While cooling, the vessel is dipped intermittently into cooling liquid. William H. Sawyer, of Providence, R. I., is the inventor.

A NEW FORM OF TIN. called by the inventor, Albert Assam, of Rahway, N. J., "assayme," is produced by special treatment of tin. It has all the good qualities of the latter, can be precees into any shape, or cast into statuary, or used for plateware of any description. A beautiful bronze color can be given to the latter, or any shade from bronze to a silver color; and as it does not in the least corrode, it is especially valuable as a silver solder. It melts at a temperature of 430°, or 18° less than tin.

A NEW IMITATION OF GOLD.—A treatment of copper, tin and aluminum in an electric furnace is said to have stood the tests of acids and other means by which counterfeits are detected. The only failing is in the weight of the metal thus produced. That there is a great revolution ahead in the novel and unexpected developments of aluminum, in combination with other metals, as well as in its own individual applications, there can be no question.

TO SOFTEN LEAD.—There is no better way for softening lead than by recasting. If it is pure, it should be soft. Otherwise use it for other purposes than those which require the pure metal.

TEMPERING BRASS SPRINGS.—There is no way to temper brass springs except by hammering. There is no chemical or heating process for tempering anything but steel.

SCIENTIFIC PROGRESS.

The New Electrical Force.

Not long ago Mr. Langdon Davies, of London, while investigating the induction noises caused in the telephone wires, came to the conclusion that the effects ascribed to induction afforded evidence of the existence of a form of electrical force which might be separated from currents, and which could pass freely through insulators impassable by currents. His conclusions were justified by experiments, but it was not until a short time ago that phonoporic telegraphy could be successfully employed, and that the principle could be utilized upon an existing telegraph line which was at the same time being worked by the ordinary instruments.

The phonoporic instruments have no conducting circuit through them, but this is nevertheless a fact. The phonopore gives uninterrupted passage to electrical effects capable of being associated with sound, although it does not permit the passage of electric currents. In exterior form the transmitter appears to be an ordinary Morse key mounted on a base about four inches high. This base contains an instrument which somewhat resembles an induction coil. The impulses are generated in a primary circuit of improved construction, over which is wound, in place of a secondary circuit, a phonopore of two wires insulated from each other throughout their entire length and at both ends, each of these wires being, however, connected at one end only to the line. The number of phonoporic impulses generated in the transmitter per second is regulated by vibrations of an organ reed placed in the primary circuit. Another reed tuned to the same rate of vibration is placed as a receiver at the distant station in front of an electro magnet, and the phonoporic impulses from the transmitter cause it to vibrate. A new form of contact breaker, operated by the receiver reed, completes a local relay circuit when the reed is still, but breaks it whenever the reed vibrates, thereby setting in action any required instrument in connection with any battery.

Careful, patient, and extensive experiment have more than realized all the expectations based on this discovery. There are many advantages which the duplexing of a telegraph service by adding a simplex phonopore possesses over the ordinary duplex system now in use. The cost of construction and of working is much less, and messages can be carried either in the same or opposite directions. Moreover, if the line is already working either the duplex or simplex on the ordinary system, the phonopore can still be added to it as if the wire were being used for nothing else. The phonopores are easily worked, and in the trials mentioned the instrument was worked at one station by a boy of 16, who had no experience with it.

The following description from *Nature* more fully describes one of these instruments: The instrument, while absolutely a non-conductor of continuous electric currents, still allows of the passage or transmission of rapidly alternating currents such as correspond to sound in vocal and harmonic telephony. The "phonopore" consists essentially of two insulated wires laid side by side, twisted together and wound upon a bobbin, one end of each wire being completely insulated. Regarded as a condenser, its capacity is very feeble indeed. Regarded as an induction coil neither the primary nor the secondary forms a closed circuit. Yet it transmits telephonic speech perfectly. It follows that Mr. Davies has solved the problem of telephoning on an open circuit. But the real object of the invention is to enable telephonic messages, including both vocal and harmonic under that name, to be transmitted through the ordinary telegraph wires without interference with or from the telegraphic messages that are simultaneously passing through the wires. Mr. Davies has devised a whole series of new telephonic apparatus in which not only the induction-coils of the transmitters but also the bobbins of the receivers are replaced by open-circuit phonopore coils. Apart from its purely technical value, the new instrument presents several points of great scientific interest, and opens up entirely new problems to the mathematical physicist.

FIXATION OF THE GASEOUS NITROGEN BY ARABLE SOILS.—According to the author's experiments, arable soil continually fixes free atmospheric nitrogen, even without any vegetation properly so called. This gain cannot be ascribed to atmospheric supplies or nitrogenous compounds, whether gaseous or dissolved in rain-water. In the experiments where the rain-water flowed away outside after having traversed the soil, the rain removed from the soil, in the shape of nitrates alone, more nitrogen than it had brought in the shape of ammonia and nitric acid taken together. Nevertheless the fixation of nitrogen was more considerable in earth exposed to the rain than in such as was under cover, doubtless by reason of the greater activity of the organisms which fix nitrogen by the circulation of air and water.—*M. Berthelot*.

ELECTRICAL STOVES.—Electrical heating stoves are being introduced in France, a peculiar feature of their construction being that the wires are let through apertures formed in plates of refractory clay and plumage. These plates are not inclosed, but are left exposed, so that

the air can circulate very freely through the apertures, where it comes in contact with the red-hot wires. Wire bobbins are inserted in the apertures, each bobbin forming part of the electric circuit, and all being connected for quantity; the bobbins are heated by the passage of the current, and serve to heat the air as it passes to and fro over them.

The Comparative Effects of Heat and of Solar Light.

All the actions of combustion which heat can produce may be also produced by light, but the converse does not hold good. There are many reactions which light alone seems able to set up. All these reactions may be summed up as a disturbance of the primitive molecule which is decomposed into simpler elements. These elements are few in number; they are, if we limit ourselves to volatile bodies, formic, acetic and butyric acids, methylic and ethylic alcohols, and ethylic aldehyde. These stable groups are generally found the same with one and the same body, whatever the source from which it derives its oxygen. But this is not always the case. Thus lactic acid, if burnt by means of atmospheric oxygen, yields acetic acid, but produces butyric acid if it obtains its oxygen from the salts of mercury. These stable residues of combustion do not pre-exist as groups in the original molecule, but result from a new arrangement of the molecules during combustion. This is proved by the fact that they are found identical in bodies of different types, and are not always the same with one and the same body. These products contain a smaller number of molecules of hydrogen and carbon than the bodies whence they are derived. The sole exceptions to this rule, the formation of formic acid at the expense of oxalic acid, and that of butyric acid from lactic acid, disappear if we double the formulae of oxalic and lactic acids. Potassium permanganate, which often acts in the cold and in darkness, does not yield other products than those resulting from the action of the sun and of heat. The bodies which it attacks are those which are found least stable under other oxidizing conditions. But if it does not occasion any novel facts, we may study with it very conveniently the circumstances of the experiment and the conditions of initial or final acidity or alkalinity which determine the result. These last conditions play a great part in the combustions made at the expense of oxygen, free or combined.—*E. Duclaux*.

FOSSIL CHARCOAL.—A correspondent of the *Scientific American* says: Perhaps charcoal has not often been observed as occurring naturally with mineral coal, though, as a result of metamorphism, graphite is not uncommon in coal districts. In a variety of hituminous coal that comes from Tennessee, there are to be seen along the cleavage planes films of true charcoal, in varying quantity, but commonly thin. This coal has been coming to us for several years, and all the while I have noticed in it the presence of the charcoal. I have scarcely ever put coal into the fire without making the observation; and there is perhaps not a lump, of size at all considerable, that does not contain these films. On close examination I have frequently found that the surface of the films on the broken lumps contains a delicate tracery, closely resembling vegetable impressions. The tracery is not so well marked as a fossil imprint, but not so indistinct as to escape notice.

SCIENTIFIC EXPLORATION.—An exploring expedition is being organized by the Dominion Government for the exploration and topographical survey of the western portion of the Canadas. The expedition will be conducted by Dr. Geo. M. Dawson and William Ogilvie and will extend its operations along the Stickeen river, along the Pacific Coast to the head of Chilcoot inlet, and survey the Yukon river as far as the 140th meridian. Assistant Secretary Maynard, of the U. S. Government, has instructed the custom officers of the Alaska district to allow the free entry of the members of the expedition and their effects, exercising only such supervision as may be necessary to protect the interests of revenue.

EFFECT OF THE ELECTRIC LIGHT UPON PLANTS.—A citizen of Davenport, Iowa, whose garden is situated at 100 feet from an electric light tower, has remarked that his lilies close at sunset, but open again a few minutes after the arc lamps have been lighted. It has been observed at Detroit, too, that the foliage of the trees exposed to the rays of the electric light is much more luxuriant than that of trees as are not.

UNDERGROUND ELECTRIC WIRES.—After a year's experience with underground electric wires, Philadelphia has found that it matters very little what sort of conduit is used. The public system there consists simply of a plank box containing lead-covered wires, filled in with pitch, and this fully answers every purpose.

NATURAL CURIOSITIES.—Coal miners frequently find curious formations in a vein of coal. An Annot (Pa.) miner took out a piece of sulphur a few days ago which was a perfectly formed ear of corn, the kernels and rows being very distinct. It was under 20 feet of solid rock and in the middle of the coal vein.

TELEPHONING between New York and Philadelphia is now as easy as it was between points about a block apart a few years ago.

Mining and Grazing Interests Compared.

Most sections of the great West, says the *Cour d'Alene Record*, have two leading industries, viz; stock-raising and mining. *Cour d'Alene* can boast of only one, and that the greater, as we shall endeavor to show. Which of these industries promotes the greatest good to the greatest number? Take a section of country devoted entirely to stock-raising, and about the only evidence of civilization we see is here and there a tent—the headquarters of a half dozen cowboys. The stockman selects his range and moves thence his herd. He is not desirous of neighbors, and should any encroach upon his domain he moves farther on. Once a year he drives his "surplus stock to an Eastern market, disposes of it and deposits his money in an Eastern bank. Little is the benefit derived from stock-raising except by the favored few who own the "cattle on a thousand hills.

On the other hand, consider the mining industry. A prospector discovers a mine. He develops it. Others, encouraged by his success, follow in his footsteps. The country is prospected, mines are developed and sold. There is a demand for the mechanic, the miner, laborer, artisan, and in fact, for followers of every branch of industry. Mercantile houses become a necessity. Towns and villages spring up as though by magic. Railroads extend their lines in that direction. Reduction works are built. The ranchman has a market for his produce, the teamster work for his team, and all classes prosper. On the one hand, a lazy herd grazing on the hills or in the valleys; on the other, the hum of industry and scores of happy and pleasant homes.

The days of immense profits in stock-raising are past. The ranges are overstocked, and the losses are great compared with what they were a few years ago. The ravages of disease among cattle, horses and sheep engross the attention of legislative assemblies. The hard winters and severe drouths cause alarm to stockowners, and already humanitarians are holding meetings in Eastern cities to devise ways and means to prevent people from keeping more stock than they can feed through the winter. All of these facts go to prove that this great industry must in a measure decline, and capital will seek other channels of profitable investment.

By keeping mining on a perfectly legitimate basis, by thoroughly developing such property and erecting the proper machinery for treating the ores, and by having men at the head thoroughly competent of managing such enterprises, there is no reason why this industry should not secure the aid of capital that would otherwise go to the stock business. By taking the same precautions as are considered necessary in all branches of trade, there is no reason why mining should not be made remarkably remunerative.

The mine-owner need not fear a rigorous winter; the drouth does not affect his interests, and pleuro-pneumonia and black-leg have no terrors for him. His product always finds a ready market, and, as applied to gold and silver, is the basis upon which rests the financial world. Wild-cat schemes and mining sharks should be discountenanced. The business should be purged of all things contrary to its advancement, and then the necessary capital will come to its aid without the hesitation heretofore experienced.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

JOINTER FOR ARTIFICIAL STONE WORK.—Geo. F. Gray, No. 361,692. Dated April 26 1887. The invention relates to the class of implements that are used in working with artificial stone in the laying of sidewalks, etc., and the invention consists in a jointer for rapidly and accurately making the joint between the independent blocks of artificial stone. The jointer is a handled tool having projecting from the plane of its face, and on the side thereof, a knife or cutter, the outer side of which is perfectly straight.

WATER-WHEEL BUCKET.—Henry Richards and W. J. Richards, Jr., Nevada City, No. 361,719. Dated April 26, 1887. The invention relates to that class of water-wheels in which a series of buckets on the rim or periphery of the wheel receive the impact of a stream of water issuing under head or pressure from a nozzle in close proximity, these wheels being generally known as "hurdy gurdys." The invention consists in the novel bucket, by means of which the construction of the wheel is simplified and the most effective reception, discharge and reaction of the stream is obtained.

A NICKEL (5 cents) COIN.—The Government 1½ cents. If the Government had the exclusive manufacture of these coins, there would be a great profit in them. But the coin can be so easily reproduced there is no means of estimating how many of them are counterfeit.

LAKE COUNTY has appointed men to solicit subscriptions for the \$75,000 bonds asked by the San Francisco and Clear Lake Railroad.

USEFUL INFORMATION.

INDIA-RUBBER HORSESHOES.—We have already made reference in these columns to the use of india-rubber as a material for horsehoes. We here append from an exchange some further facts and suggestions: To enable the horse to go easily over all kinds of roads and rough or slippery ground without slipping, Mr. W. Body, of Wittersham, proposes an india-rubber horsehoe, which, he says, obviates in one instance the necessity of using an iron shoe, and can be removed momentarily when the horse is not traveling; it can also be used when the horse is shod with an iron shoe. The shoe consists of an india-rubber bottom piece molded to fit over or round the frog and the hoof, with a ledge or projecting rim rising up the front and around about level where the nails are clamped, the projection having an edging, under which a steel band or other appliance can be drawn and nipped tight to retain the rubber shoe. The band is connected by studs, which pass through the heel part of the hoof, this being cut away from the inner side for the purpose. The stud or studs may work eccentrically to obtain the grip or fixing. The rubber shoe is preferably used without an iron shoe, particularly with young horses or horses with tender feet, but a light iron shoe may be affixed on it. If the india-rubber shoe is used with an iron shoe, the frog portion or pad has a front plate and two side wings partly imbedded in it, the projecting parts taking under the iron shoe to fix the rubber shoe in place. If the rubber frog be divided or made thin in the center, a swivel or other bar can be contracted from the rear to reduce the width of the pad so that it enters easily, and also expanded to fix the rubber shoe in position.

A NEW DANGER FROM THE BOTTLE.—Mr. G. W. Fitton writes to the *Chemist and Druggist* that he has narrowly escaped what might have been a serious affair. "Not having the blind down in front of the window as usual," he writes, "and the sun being very strong, the rays, after passing through a large carboy filled with the usual solution of bichromate of potash, were thrown on to the woodwork of the window inclosure, soon burning a piece nearly one-fourth of an inch thick and four inches long; more would have followed had I not discovered it in time. Should like to know," he adds, "if you have heard of a case like this occurring before?" There have been a number of similar incidents recorded, and it tends druggists in hand to be careful about displaying globular shaped jars in their windows where the sun's rays can be refracted by them.

A NEW WAY OF KEEPING STORE ACCOUNTS. The retail grocer at Burlington, Ia., is putting into practice a new scheme for keeping accounts with their customers. A small book of coupons, ranging in value from 1 to 50 cents, is furnished to the customer and is charged to him. When he orders goods he tears out coupons to the value of the order, in the presence of the grocer or his clerk, and destroys them. When a \$5 or a \$10 book of coupons is reduced to the cover, it is good evidence that goods to the value it represented have been purchased. It amounts to the same thing as paying spot cash for every order, but the customers have the privilege of paying for the coupon-book when it is used up. There are quite a good many advantages to be mentioned in favor of this system, and it will probably supersede in a great part the old style of book accounts.

ARTIFICIAL WHETSTONES.—The *Guide Scientifique* describes the following method of making artificial whetstones. Gelatine of good quality is dissolved in its own weight of water, the operation being conducted in a dark room. To the solution 1½ per cent of bichromate of potash is added, which has previously been dissolved in a little water. A quantity of very fine emery, equal to nine times the weight of the gelatine, is intimately mixed with the gelatine solution. Pulverized flint may be substituted for emery. The mass is molded into any desired shape, and is then consolidated by heavy pressure. It is dried by exposure to strong sunlight for several hours.

SIMPLE MEASUREMENT.—The approximate breadth of a river, or other stream, may be determined by means of the brim of a hat or the peak of a cap, and this can be done by a boy as well as a man. The person desiring to ascertain this fact must place himself at the edge of one bank of the river and lower the brim of his hat, or peak of his cap, till he finds the edge just cuts the other bank; then after placing the hand under the chin, he must turn round steadily till he faces some level ground on his own side of the river, and observe when the edge of the peak again meets the ground. The measure of this distance will be very nearly the breadth of the river.

OLIVE OIL FOR LUBRICATING PURPOSES.—Put pure olive oil into a clear glass bottle with strips of sheet lead, and expose it to the sun for two or three weeks, then pour off the clear oil, and the result is a lubricant which will neither gum nor corrode. It is used for watches and fine machinery of all kinds.

UTILIZING THE SPARROWS.—Here is the way they make sparrows useful in Germany: Long troughs, placed at the eaves of houses, are occupied by the sparrows in building their nests.

When the young are hatched and the mother goes out to procure food, wire screens are placed over them, with interstices large enough to permit the passage of food in to the younglings but too small to allow them to escape. As soon as they are large and plump they are killed, and make a very desirable article of food.

BRUISES ON WOOD.—Bruises may be taken out of the woodwork of scientific instruments by wetting with warm water. Then lay on the place brown paper about five layers thick, and apply a hot flat-iron until the moisture is evaporated. If the bruise is not gone repeat the process. If the bruise is small, merely soak it with warm water and apply a red hot poker near the surface. Keep the wood wet and in a few minutes the bruise will disappear.

TO DETECT SEWER GAS.—A very simple test to ascertain whether the air of any apartment contains sewer gas is made by saturating unglazed paper with a solution of one ounce of pure lead acetate in half a pint of rain-water; let it partially dry, then expose in the suspected air. The presence of sewer gas in any considerable quantity soon darkens or blackens the test paper.

HOW TO TELEPHONE EASILY.—It is said that an ingenious German has discovered that one may talk more easily through a telephone, and even converse in whispers, by making a funnel of thick manilla paper about 16 inches long and from 6 to 8 inches wide at the mouth, and placing the smaller end over the opening of the receiver.

ELECTRICITY FOR CAPITAL PUNISHMENT.—The Senate of Pennsylvania has passed a bill providing for the infliction of capital punishment by electricity. There are several patented devices in existence designed for such work.

STRAW-BURNING STOVES.—The Vulcan Iron Company, Winnipeg, Man., manufactured a large number of straw-burning stoves during the past season, the article going into consumption among the farmers in that section.

TO CONVERT CENTIGRADE DEGREES INTO FAHRENHEIT.—Double the number of Centigrade degrees, subtract one-tenth of the amount, and add 32 to the remainder. For temperatures below 0 Centigrade, subtract 32.

VINEGAR is better than ice for keeping fish. By putting a little vinegar on the fish it will keep perfectly well, even in very hot weather. Fish is often improved in flavor under this treatment.

THE OLDEST PICTURE in the world, or what is supposed to be such, is in the museum at Boulak, in Egypt. It is a fresco from a tomb at Maydoom, representing six geese.

GOOD HEALTH.

STOMACH DIGESTION.—Opportunities for studying gastric digestion through fistulous openings into the stomach are, thanks to modern surgery, more frequent than formerly. This is important, as the physiology of digestion, as understood at the present day, requires more than the classical instance of Alexis St. Martin to place it on a sound experimental basis. Such a case, with experiments *ad hoc*, is recorded in the *Revue Scientifique* by Von Herz, of Lausanne. The subject was a man, aged 28, on whom gastrotomy had been performed for occlusion of the oesophagus. The observations made were as follows: Bile always appears in the stomach during digestion, but generally only in the later stages. The amount of HCl amounts to 1.5 to 1.9 grammes per liter; it increases during digestion, and reaches its maximum in the third hour. Sodium chloride appears rather to diminish the amount of acid. When the stomach was empty in the morning but little pepsin was found, and a large amount of propepsin; pepsin accelerated digestion. In the first hour, of a quantity of albumen introduced, two per cent was digested without pepsin, 12 per cent with it. In the second hour, 23 per cent was digested without, 45 per cent with pepsin. In the third hour, 51 per cent without, 76 per cent with pepsin. These results agree with those obtained by Schiff. Chloral, quinine sulphate, and above all potassic iodide, retard digestion. The author would forbid red wine in disturbances of digestion, but would recommend bouillon and dextrin; blood fibrin is also indicated in many cases. —*Medical Press.*

CARE OF THE HANDS.—There are not nearly as many secrets in hand treatment as people imagine. A little ammonia or borax in the water you wash your hands with, and that water just lukewarm, will keep the skin clean and soft. A little oatmeal mixed with the water will whiten the hands. Many people use glycerine on their hands when they go to bed, wearing gloves to keep the bedding clean; but glycerine does not agree with every one. It makes some skins harsh and red. These people should rub their hands with dry oatmeal and wear gloves in bed. The best preparation for the hands at night is white of egg with a grain of alum dissolved in it. Quacks have a fancy name for it; but all can make it and spread it over their hands, and the job is done. They also make the Roman toilet paste. It is merely white of egg, barley flour, and honey. They

say it was used by the Romans in olden time. Any way, it is a first-class thing; but it is a sticky sort of stuff to use, and does not do the work any better than oatmeal. The roughest and hardest hands can be made soft and white in a month's time by doting them a little at bed time, and all the tools you need are a nail-brush, a bottle of ammonia, a box of powdered borax, and a little hue white sand to rub the stains off, or a cut of lemon, which will do even better, for the acid of the lemon will clean anything.

IS THE BARK OF THE LOCUST TREE POISONOUS?—The inner bark of the fragrant flowered locust (*Robinia pseudacacia*), commonly cultivated as an ornamental tree, and for its valuable timber, has long been known to have a sweetish taste, resembling that of licorice, and to have emetic and cathartic properties. But we believe it has never been considered poisonous. In the *New York Medical Journal* of January 22d, Dr. Z. T. Emery reports a case of poisoning of 32 boys at the Brooklyn Orphan Asylum from chewing some of this bark, which they had obtained from fence-posts in the yard. In the mildest cases, vomiting of rosy mucus was observed, together with flushed face, dryness of throat, and dilated pupils. In the severest cases, large quantities of rosy mucus mixed with blood were vomited. The other symptoms were retching, pain in the epigastrium, debility, stupor, cold and pulseless extremities, a feeble and intermittent action of the heart, dilated pupils, and face of a dusky pallor. The patients were given subcarbonate of hydrogen and brandy by the mouth, and morphia hypodermically; sinapisms were applied over the stomach, and bottles of hot water along the extremities. The patients were discharged from the hospital in two days.

WHERE TO DIG THE WELL.—Let us remember that a well will drain an area with a diameter equal to twice its depth. Therefore, a well 12 feet deep will drain an area the diameter of which is 24 feet, that is to say, that it will drain the surrounding soil for 12 feet in every direction. Obviously then the privy should be more than the depth of the well away from it, and more than this again if it is proposed to place it on a higher level, which, however, should never be done. The well should be lined inside thoroughly with mortar so that percolation cannot occur between the crevices of the bricks, and it should be well covered, so that surface drainage cannot get into it, for you want to drink water that has come into the well from the bottom, after it has been purified by filtration through the earth. Thus, then, these are the precautions to be observed in locating and building your well in the country. How about the city? Well-water in the city should never be used; the sources of contamination are too numerous and too hidden to be avoided. —*Annals of Hygiene.*

A MODERATE USE OF TOBACCO.—The use of tobacco, as distinguished from its abuse, ought to be a matter of intelligent observation and experience. We should incline to the opinion that any particular individual who can say, "I always know when I have smoked enough—if I go beyond the just limit I lose my power of prompt decision," had better not smoke at all. It is clearly unwise for a man who cannot swim to persist in dabbling in deep waters. There are currents and under-draughts which may at any moment destroy his balance. The very reverse of the complaint made by this person is the experience of most smokers. A moderate use of tobacco soothes the senses and leaves the mental faculties free from irritation and ready for calm, clear intellectual processes. When this is not the effect produced by smoking, the "weed" had better be eschewed. —*The Lancet.*

TO DEVELOP THE LUNGS.—If a person's lungs are not well developed, the health will be imperfect, but the development may be increased several inches in a few months by daily outdoor runnings with the mouth closed, beginning with 20 yards and back, at a time, increasing ten yards every week, until 100 are gone over twice a day. An ensthite for ladies and persons in cities is running upstairs with the mouth closed, which compels very deep inspirations, in a natural way, at the end of the journey. Of course, such violent exercise should never be resorted to where there is any tendency to heart disease.

MIND AND HEALTH.—The mind depends for its health very largely on bodily conditions. The gloomy fears, the deopendent views, the weariness of soul that many complain of, would often disappear were the blood made pure and healthy before reaching the delicate vessels of the brain.

RESPONSIBILITY OF LANDLORDS.—A mother and four children recently recovered damages from a landlord in Boston for sickness resulting from bad sanitary arrangements of their house, ranging from \$200 for one child to \$1600 for the mother.

SWEET OIL TO PREVENT SCARS.—In the healing of burns and scalds, where there is danger of contracting scars, rub the new skin several times a day with good sweet oil. Persist in this rubbing until the skin is soft and flexible.

BREAD FRESH AND STALE.—Fresh bread is not allowed in the British army. It must be at least 12 hours old before being used as food.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

EMPIRE.—Amador Ledger, May 7: An immense air chamber was placed in the Empire mine of Plymouth on Tuesday. It is 54 feet high, and 42 inches in diameter, and of steel. The object is to take the immense pressure off the water pipe when the water is suddenly shut off from the works. The first one put in worked so satisfactorily that the company concluded to try another of the same size. An expert machinist was sent up from San Francisco to put it together, and to superintend its erection. It came up in three sections, weighs about seven tons, and cost something like \$2500. Sinking is in progress at the Olive mine at Drytown. It is said that the yield of ore from this claim crushed at the five-stamp mill erected on the property, was more than sufficient to pay running expenses. Some 20 men are now working at the big tunnel property at Middle Bar. A small crushing of 18 tons of rock from one of Spagnoli Brothers' claims near Clinton, yielded a trifle over \$3 per ton. The rock was taken from an old dump pile, and a large percentage was dirt. The yield is considered satisfactory. Water-power hoisting works are to be erected on the Middle Bar mine. We are informed that the shaft is 50 feet deep, and that some good-looking ribbon rock is being taken from the bottom.

SOUTH SPRING HILL.—Amador Sentinel, May 5: One of the best paying mines in this county is the South Spring Hill, at Amador City. Its levels are opened at depths of 500, 600, 700 and 800 feet, the ore body being from one to 50 feet wide, and paying from \$3 to \$40 per ton. Thirty stamps crushing 70 tons per day are kept constantly running. Steel tappets, shoes and dies are used, and the Frue concentrators, Challenge ore-feeders and Blake rock-crushers are in place at the mill. In the mine the National air drills are used. The compressor is stationed at the mill, 2000 feet away, and is fitted with an automatic gate, there being no blow of escape steam or air. When the miners stop using the air drill and the pressure gets to 90 pounds on the gauge, the compressor stops, and when they begin to use the compressed air, the pressure falls to 65, when the gate will open of its own accord. The superintendent, John R. Tregloan, deserves credit for the persistency with which he stayed by his faith in this mine, under discouraging circumstances, until the bonanza was finally uncovered.

SUTTER CREEK.—Cor. Amador Ledger, May 7: The change in the proprietorship of the Mahoney will no doubt lead to the resumption of work in the shaft in a few days. The water will be taken out for about 300 feet to begin with, and as soon as one or two levels have been put in good working order, they will drain the shaft deeper with the view of getting other levels in operation. John McIntyre will likely recommence work on the claim between here and Amador City in a short time. Everything at the Wildman is running favorably. The water is down about 150 feet, and before it can be lowered much further, the large hydraulic pump will have to be placed in position. Laying the pipe from the Amador canal to the Kennedy mine is making satisfactory headway; they expect to have it completed this week.

El Dorado.

MORRIS.—Mountain Democrat, May 7: Among the mining properties in this county coming rapidly forward is the Morris claim, near Latrobe, formerly well known as the Larison mine. This has been pushed forward rapidly of late and considerable work done on it. New and extensive machinery has lately been put upon the claim, with a view to sinking to a greater depth. The shaft is already down 200 feet, and we understand to be sunk 300 feet further at once. The owners of this property are Santa Clara county men, and have faith enough in the value of their property to put extensive machinery on the claim and thoroughly prospect it before putting up a mill.

Mariposa.

SAXTONS CREEK.—Cor. Mariposa Gazette, May 7: There is good news from the Buena Vista mine; it is reported that they have struck good ore. When you have a capable manager to take hold of a mine and sufficient means behind him, you may look for a good result. The recent development will put the Buena Vista among the most promising mines of the county. There are plenty of good mines in the vicinity; all that is lacking is capital to develop them. The deepest shaft in any mine, in this part of the county, is the one at the Buena Vista, 200 feet deep. Almost all the work done on the mines here is like a gopher's burrow, near the surface. These mines are only waiting for capital to be a bonanza for those who will take hold.

Mono.

THE BODIE.—Miner, May 9: The east crosscut, 900 foot level, was driven 18 feet, through very favorable rock; and south drift was started and run 11 feet upon a vein which shows some fair ore. Having succeeded in getting the water out, are now replacing tracks, switches, etc., on the 100-foot level, and the work of prospecting this portion of the mine will be vigorously prosecuted. There were employed five miners, and jointly with Mono, three engineers, three firemen, two carmen, one carpenter, four miners, one pumpman, two shaftmen, one watchman, one foreman, and jointly with Mono and Bulwer, one blacksmith, one helper.

Nevada.

NORTH BLOOMFIELD.—North San Juan Times, May 6: The Derbec mine gives employment to about 130 men. They are worked on two shifts. Wm. M. Davis is boss of the day shift. S. Galavotti is the general superintendent. The mine is paying very largely, and it is worked as economically as it is possible to work it.

NORTH BLOOMFIELD is the liveliest town in the county. Its close proximity to the Derbec and Mabel makes it so. It is the headquarters for all the people in that section of the country. While at Bloomfield we met our old friend General Dobbie. The General read us a lecture because we will not advocate the closing of drift and quartz-mine, and because of our position on the Hobson matter. The General is in favor of a dog-in-the-manger pol-

icy; that is, if you can't eat bay yourself, nobody else should be allowed to do so; if he can't mine by the hydraulic process, no other person should be allowed to mine by any process. This is a kind of policy we can't sustain. It is a sickening sight to see the North Bloomfield mine lying idle. There are millions of dollars almost in sight, and yet the gold cannot be taken out of the earth because of the enmity of Judge Sawyer to hydraulic mining. Could the North Bloomfield mine be worked by the hydraulic process, hundreds of idle men would be set to work, and very soon millions of dollars' worth of gold that is now lying dormant in the ground would be circulated among the people.

MOVING A MILL.—The 10-stamp mill heretofore on the New England or Thomas mine is being removed to the Oro Fino mine, where it will be used in crushing the large and rich ore body recently found in the latter claim. Messrs. Robinson & Battey have had much to contend with in putting their property in its present splendid condition, but the indications are that their perseverance and energy will not go unrewarded.

RESUMED WORK AT THE PEABODY.—Transcript, May 10: Some other men have been found to take the place of the lessees who quit operations Saturday, at the Peabody mine, in Grass Valley district. The bottom pump, which had been pulled up, was to be replaced yesterday.

Placer.

FOREST HILL DIVIDE.—Placer Herald, May 7: Although there is no excitement in mining circles, a great deal of work is being done quietly in prospecting and opening the mines. At the Mountain tunnel they are running drifts in various directions. Breece & Wheeler are prospecting their way to the famous upper lead. Mr. Dodge has extended the Baker Divide tunnel 2500 feet into the main ridge and is getting ready to make an upraise. Col. J. H. Keown intends to pierce the Hazard mine by means of a tunnel, which will involve a smaller expenditure than the present way of working. Through the kindness of Mr. Chapellet, we had the pleasure of visiting the new tunnel and seeing the machinery that is extending the tunnel up Brushy canyon to the famous Mayflower mine. On the failure of Mr. Boyle to complete the tunnel, the company authorized Mr. Chapellet to prosecute the work according to his own plan. Mr. Chapellet immediately set to work and had got the water under control, and was confident he would have the shaft emptied by the middle of this week. The shaft is 326 feet deep. The air-compressor and hoisting works are at the top of the shaft and are under one roof. Leading from the compressor is an iron pipe which stretches 4200 feet down the canyon to the mouth of the tunnel, which it enters and conveys the compressed air 2200 feet up to the head of the tunnel, where it operates the Burleigh drills. Mr. Chapellet is preparing to erect another compressor at the mouth of the tunnel. The length of tunnel so far run is 2500 feet, the height eight feet, and the width for the first 300 feet is eight feet; the bore gradually narrowing to six feet from this point. The grade is one-half inch to the rod. The tunnel is in a slate formation and is remarkably dry. The cars run on T rails and are switched at regular intervals. In a short time horse-power will be substituted for man-power in running the cars. At the mouth of the tunnel is a fan which forces the outside air through an iron pipe up to the face where the men work. This constant current keeps the air fresh and wholesome. About 1500 feet below the mouth of tunnel is the Live Oak mine. Mr. Chapellet will have completed the mill by this writing. The mill will be run by the tunnel and the canyon water, which is caught and stored in reservoirs ready for use. The tunnel is in 1500 feet and pierces a rich body of gravel. The company employs about 30 men. The force will be increased as soon as circumstances permit.

Plumas.

ATTACHMENT.—Greenville Bulletin, May 5: Last week the Round Valley Water Co. attached the Plumas Con. M. and M. Co. for something over \$4000, and Judge Goodwin has begun proceedings to foreclose a mortgage on the Union quartz-mine and mill.

Shasta.

COPPER CITY.—Courier, May 7: Copper City has probably had more ups and downs, mostly downs, than any other quartz-mining camp in Northern California. The first quartz mines were discovered there on Kellinger bill, in 1862, by J. P. Williams, followed soon after by the discovery of the deposits on Bully bill. Copper City grew up like magic. Citizens of Shasta and Red Bluff alone had about \$200,000 invested in the district. All at once the mill and mines closed with a snap. At the close of 1864 there were not two dozen voters left in the district. This desertion continued until about nine years ago, when the mines took another boom. A large quartz-mill, sawmill, three-mile railway, etc., was built, and another booming, blooming town sprung into existence on the old site. But, to the surprise of all, the mill and mines were shut down, the machinery soon hauled away, and Copper City again almost deserted. Some months ago it was given out that the Wintrop Co., backed by abundant capital, would not only make a large new plant of machinery, but proceed to work the mines on a large scale by the most approved appliances known to practical and scientific mining. The last reports from there, however, are not encouraging as to the progress of the company, but we hope to chronicle good news from the district soon.

Sierra.

TUNNEL.—Mountain Messenger, May 7: The new South Fork tunnel, at Forest City, is in 2000 feet, and the face is in bedrock. The presumption is that pay gravel of the deep, lava-capped channel is above, and an upraise will be made, when, if it is so, the ground will be opened out for thorough development.

YOUNG AMERICA.—The Young America Co. cleaned up \$31,000—the first good returns since the mill started, about the middle of March. The timber contract for the Young America quartz mine has been awarded to Mr. Martin, of Truckee. The contractor is to deliver 70,000 feet at 8½ cents per foot, at the mine.

Trinity.

EASTMAN'S GULCH.—Journal, May 7: From Mr. Jas. Feour, of Eastman's gulch, we learn that quartz interests in that section are developing very

favorably. The mill on the Venicia mine will be completed about the 15th of this month. As the mill will do custom work, it will be of great advantage in giving a working test of the value of the many ledges in that vicinity. Quite a lot of ore is now there waiting to be crushed. Jas. Fisher, of the Nob mine, has from 75 to 80 tons of fine-looking rock on his dump; Feour & Forcade, lessees of the Newman, have eight tons of very rich quartz; Hill & McGiffin have about 100 tons of good-looking ore ready for working; Tom Leas has about 37 tons out with plenty more in the vein; Hamilton & Gifford have abandoned the tunnel which they have lately been running and are now working on the old Blanket ledge, from which they are taking very good rock. On the whole, the outlook for a busy spring in that camp is very good; there are quite a large number of men there now, and more will follow as the weather is favorable for prospecting.

NEW RIVER.—Last Saturday we received a visit from Mr. Dow, who had just returned from New River, and from whom we gathered the following facts. Notwithstanding the heavy fall of snow, work has progressed steadily in the mines all winter, and a good lot of ore showing free gold has been piled on the dumps. The snow has disappeared and five mines are now running, hampered only by lack of miners, for whom there is quite a demand. The small stamp-mill on the Ridgeway crushed out about \$10,000 during the past four months. Mr. Dean, superintendent of the Ridgeway, has just discovered a six-foot ledge on the property, which shows every sign of permanency and which will be of great value in establishing the status of the camp. Good ore from the Tough Nut and Mountain Boomer is being crushed by their respective arrastras, each with a capacity of about a ton a day. It is estimated that 600 ounces of dust is being shipped each month, and the outlook for the increase in number and value of the mines is most favorable. The camp has a bright future before it in prosperity and permanency.

EAST FORK.—Trinity Journal, May 7: Mr. Dedrick showed us some very rich specimens from the Saturday Night mine in the East Fork district, owned by Dedrick, Farmer, and Knowles. The rock was very rich, being mostly gold. They have been working the mine but a short time and have run a tunnel in on the ledge about 35 feet, and have taken out about six tons of rock, all of which shows free gold. They have a well-defined ledge ranging from six inches to two feet in width, the vein, where richest, being about 12 inches wide. Work will be pushed on the mine till it is well opened.

HAY FORK QUARTZ.—The 20 tons of quartz from the ledge of Searls & Rennie, which has just been crushed in Mr. Shattuck's mill, yielded \$20 to the ton. A few tons from the Magdalene yielded about the same. This test shows that the mines are valuable.

Tuolumne.

THE CARDINELL MINE, TUTTLETOWN.—Tuolumne Independent, May 7: This mine was discovered and worked as early as 1853, by a company of Mexicans, and afterward came into possession of John Cardinell, whereby its name. Cardinell worked the mine off and on, up to about the year 1857, realizing from it large returns, since which time, and until very recently, when Messrs. W. G. Long and Jos. Hampton took hold of it, the mine had practically been abandoned. It may be looked for, that under management of these two gentlemen the mine will speedily be developed, and it is reasonable to presume that there still remains untold wealth in this old and almost forgotten mine. A force is already engaged clearing out the old shaft, though which the mine was worked, and retimbering it preparatory to sinking it below the old workings, which was only carried down below the outcroppings about 40 feet. The prospector of to-day is too apt to pass an old abandoned mine, giving it simply a hurried glance, with that familiar phrase, "it is played out." The mines that were worked in early days, and said to be worked out, are to-day, we may note, some of the most valuable in the county.

JUNIATTA.—Union Democrat, May 7: W. N. Harris has struck a chute of valuable ore in the Juniatta mine, which is situated between the Crystalline and Gem mines near Jamestown. Alvina Hayward and Mr. Hobart were in the county this week looking at mining property in the direction of Summerville. Mr. Hayward is operating already in the county.

NEVADA.

Washoe District.

CON. CALIFORNIA AND VIRGINIA.—Virginia Enterprise, May 7: On the 1300 level the drift started last week in the north drift from west crosscut No. 1, at a point 91 feet from its beginning. It is going in a northeasterly direction, and is now out 61 feet. On the 1400 level, ore stopping in the body of ore found in a west crosscut from the main south drift 200 feet from the Con. Virginia shaft. The body is showing strength, and the ore it yields is of good quality. On the 1435 level continue stopping out ore from the bottom of winze No. 2, 165 feet south from the south line of the Ophir mine. The gas furnace still continues to work well as far as can be judged. The natural draft is being assisted by a blower, and that such assistance is necessary seems to indicate that all the openings have been pretty well filled with the carbonic acid gas to and for some distance above the 1700 level. At present there is every indication that the plan will prove successful. During the past week the usual quantity and quality of ore has been shipped to the Morgan and Eureka mills, on the Carson river.

SAVAGE.—The upraise in the ore body from the 600 level has been advanced 14 feet, and the ore chute is completed to the tenth floor. The winze in the ore body has been sunk and timbered 13 feet, and is now 78 feet below the sill floor of this level. On the 1200 level the north drift was advanced 25 feet. In a further distance of 60 feet, this drift will connect with the company's shaft. During the week there were 430 tons of ore hoisted from the 600 level.

BEST AND BELCHER.—On the 800 level west crosscut No. 4 was extended 40 feet; total length, 390 feet. The face continues in a mixture of porphyry and clay, with some quartz of a favorable appearance. Crosscut No. 2 has passed through a great breadth of clay, and the material in the face (por-

phyry) is still largely mixed with clay, though some stringers of quartz are beginning to be seen.

OPHIR.—On the 1055 level west crosscut north from the south drift was extended 20 feet; total length, 294 feet. This crosscut is still showing vein material and quartz. On the 1300 west crosscut No. 1, from the northeast drift, was advanced 24 feet; total length, 65 feet. A hoist engine is being placed at the head of winze No. 2, which is being sunk below this level in the north drift.

IOWA.—The ore portions show well. The mill tunnel will be connected with boulder drift early part of next week, and ore run through that tunnel to mill. Grading for mill is completed, and most of the heavy timbers for machinery are framed. The two rocker quartz-mills, rock-breaker and other machinery are in transit from San Francisco.

CROWN POINT.—Miners are gradually being put back into the ore-producing sections, though there is still a lack of facilities for milling all the ore that might easily be extracted. Meantime the prospecting drifts are finding some deposits of ore that promise to become valuable.

YELLOW JACKET.—The daily yield of ore is about 200 tons, all of which goes to mills on the Carson river. This ore—at least the greater part of it—is taken from the 1300 and 1400 levels. Above these levels prospecting work is being done all the way up to the roots of the sagebrush.

HAYWOOD.—Sufficient ore is being extracted to keep the Thompson and Briggs mills running. Two or three other such mills might easily be run could they be obtained. Last Wednesday a bar of bullion worth \$6202.94 was sent to the Carson mint; also, a sack of crude bullion which was mostly gold.

CHOLLAR.—Ore is being regularly hoisted at the Sharon shaft on the croppings. The old incline is being cleaned out and put in good working order. This is being done from the Hale and Norcross side. The incline was found considerably caved in several places. Other work is progressing as usual.

BELCHER.—Less than the usual amount of ore is being extracted, as part of the force of miners has been laid off, but there is plenty of ore in sight that will be extracted as soon as satisfactory arrangements for milling have been made. Also, some new deposits of ore are being opened up that promise well.

MEXICAN AND UNION CON.—On the 1300 level the joint Union and Mexican drift running northeasterly was extended 22 feet. This drift is now 44 feet in Mexican ground. The joint Mexican and Ophir east crosscut was extended 18 feet; total length, 410 feet.

SIERRA NEVADA.—On the 520 level west crosscut No. 9, from the north lateral drift No. 2, 160 feet south from west crosscut No. 1, was extended 65 feet; total length, 228 feet. The face still continues in vein material composed largely of porphyry and clay.

GOULD AND CURRY.—On the 625 level the east crosscut from the main south drift was advanced 30 feet; total length, 222 feet. At a point in this crosscut, 33 feet east from the main south drift, a station is being excavated preparatory to sinking a winze.

BALTIMORE.—The work of cleaning out and repairing the old drifts on the 400 level is progressing as usual. On the 300 level a raise is being made in the vein to tap the 225 level. The work of drifting on the 500 level will soon be resumed.

BULLION.—On the 200 level are drifting south on the east vein. The face is in a promising material. On the 300 level are drifting east for the east vein. The drift south on the west vein on this level is showing some very promising quartz.

OCCIDENTAL.—On the 90 level, in the lower tunnel the north drift from No. 2 upraise was extended 15 feet; total length, 209 feet. No. 2 west crosscut was advanced 10 feet. All of these openings are in quartz of low value.

JUSTICE.—The financial statement of Secretary Kelly, presented at the annual meeting, showed that for the past year the receipts had been \$13,250.14 and the disbursements \$10,049.40, leaving a cash balance of \$3200.40 in the treasury.

ANDES.—Are sinking an incline from the 240 level on the ore body. The ore still continues of good quality. A west crosscut on this level at a point 75 feet north of the incline is still in vein porphyry.

SCORPION.—On the 300 level the east drift is now advanced 355 feet from the station, having been extended 20 feet since last report. The formation in the face of the drift is vein porphyry, and shows some water.

UTAH.—On the 472 level the north drift from the main west drift was extended 41 feet; total length, 741 feet. The face still continues in vein material, composed principally of porphyry and clay.

ALTA.—On the 825 level the west drift is out about 400 feet. It is being advanced at the rate of 11 feet a day. It has yet about 100 feet to go to reach the point where it is expected that the vein will be cut.

HALE AND NORCROSS.—About half the force of miners has been employed in repairing the incline of the Chollar mine. It is found to be badly caved above the 1200 level.

VIVIAN.—A considerable amount of ore that will work about 30 a ton is being taken out and piled up on the dump.

LADY WASHINGTON.—Good progress is being made in the north drift on the 725 level. It is now out a distance of 425 feet.

MOORE AND MORGAN.—Work will shortly be started up under the superintendence of Col. S. T. Curtis.

BENTON.—Are making an upraise from the 725 level in the old Keystone vein.

Cherry Creek District.

LOOKING BRIGHTER.—White Pine News, May 1: From Dr. Campbell, from Cherry Creek, we learn that the prospects of the old camp are brightening, and it looks as if considerable work of a remunerative character would be done there this summer.

Eureka District.

ORE SHIPMENTS.—Eureka Sentinel, May 8: During the past week ore shipments were made from the mines of the district to the Richmond works—Dunderberg mine, 65 tons; Silver Lick, 15

tons; Queen, 6 tons; Grant, 5 tons. Eureka Con. —Reveille mine, 2 tons; Macon City, 15 tons; Star, 1 ton; Fraser & Molino, 8½ tons; Alexandria, 28 tons; Tybo, 1 ton.

Gillis Mountain District.

ORE.—Esmeralda *News*, May 4: E. Prince shipped 10 tons—a carload—of ore from the Burnley mine, in Gillis Mountain district, to the Reno Reduction Works. He will have another carload for shipment in a few days.

Gold Mountain District.

ANOTHER NEW MILL.—Esmeralda *News*, May 4: The Coronet Mining Company owns the mines known as the Blinn and Stewart series, at Old Camp, Gold Mountain district. It has commenced work on the mine formerly owned by Wm. Neighly, and has a shaft down 50 feet, showing a good ledge all the way down. The company has had machinery (which remained at Candelaria for a long time) shipped to a point 15 miles beyond Old Camp, where a mill is intended to be erected to reduce ore from the company's mine. The mill will be built beyond the line of this county; it will be in Nye county, but will be dependent upon the mines of Gold Mountain in this county for ore to keep it in operation. There is every prospect for better times in southern Esmeralda this summer.

Montezuma District.

FAVORABLE.—Esmeralda *News*, May 7: The indications are favorable for lively times in Montezuma this summer. Mr. Nicolson, president of the Montezuma M. & M. Co., is expected to arrive from San Francisco within a few days. The Montezuma Company is having its mill put in thorough repair, and two concentrators added thereto. The company has purchased the Tilden Hoisting Works, formerly owned by M. Swartz of Columbus, and it is now being shipped and put up on their mine at Montezuma.

Northumberland District.

STRIKE.—Belmont *Courier*, May 7: A very rich strike was made in Northumberland district, this county, last week. Several specimens of the ore were on exhibition in George Nicholl's assay office last Sunday, and quite a number of persons examined them. We are informed by Mr. Nicholl that the lowest assay gave over \$100 in silver to the ton, and the highest went over \$100 to the ton. This is remarkably good ore, and we hope that the owners of this claim will realize a fortune from it. They have been indefatigable prospectors, and they deserve a rich reward for their labor.

Palmetto District.

IMPROVING.—Esmeralda *News*, May 7: The southern portion of this county is rapidly improving; the several mining camps in that section will soon be the scene of active operations. At Palmetto district there is every indication of prosperity. The mines are looking well. The New York and Palmetto Mining Company owns several valuable mines, which show large quantities of milling ore on the dumps. The ledge on the St. Louis is stripped on the surface for more than 50 feet, showing a strong, well-defined ledge, averaging three feet wide. The ore assays from \$100 to \$300 per ton in gold. In the 250-foot level of the Silver Champion mine a two-foot ledge of rich ore has recently been discovered. The Jersey Blue mine, northwest of the Champion, is also looking well. The company owns many other claims in the district upon which very little work has been performed, but it is rumored, arrangements are being made to operate these mines on a large scale. There is an abundance of wood and water in the district, and should suitable reduction works be erected, regular shipments of bullion of considerable magnitude would be made.

Reveille District.

ENCOURAGING.—Belmont *Courier*, May 7: The mining outlook in Reveille district is very encouraging. Good reports come from all the mines, and the work of development is pushed vigorously by the owners.

Robinson District.

LOOKING UP.—White Pine *News*, May 5: This district is coming to the front with some important ore discoveries. Considerable prospecting is being done there now, and we look for good results ere summer is over. The location of the county seat at Ely is helping to interest prospectors and capitalists in the great mineral belt of that section, where vast quantities of low-grade mineral can be seen on the surface for miles around. Robinson will furnish the ore and wood and Ely the water-power for reduction works. It would not surprise us to see a population of 500 or more gather in and around this center before a year passes.

Tuscarora District.

THE GRAND PRIZE.—*Times-Review*, May 7: Active operations in the way of developing and prospecting the Grand Prize mine at various points on the 300-foot level and upward will be resumed during the present month. Nearly the entire western half of the original Virginia location, in which the first large ore body of the Grand Prize was found, remains to the present time untouched and unprospected, and virtually virgin ground, and it is this portion of the mine that attention will be first directed to, and be opened up by levels and crosscuts. Other portions of the mine above the 300 level, already opened, will also receive attention, and stringers passed by in earlier days will be followed to their termination. Several bodies of ore, though comparatively of low grade, which are known to exist in the mine, will also be looked after with a view to their future reduction. During the past two months, Superintendent H. W. Coffin, with a small force of men, has been quietly but steadily at work restoring order from the chaos which has existed around the premises since the destruction of the large hoisting works by fire two or three years ago, and from the blackened and twisted mass of ruins has, at a comparatively slight expense, restored the machinery to a condition none the worse from its bath of fire.

Tybo District.

ORE.—Belmont *Courier*, May 7: Considerable good ore is being extracted from the various mines in Tybo district.

ARIZONA.

CATARACT CREEK.—Prescott *Courier*, May 5: Cataract creek mining district is looking up. This

district is situated about 60 miles north of the A. & P. railroad, near the Supai Indian village at the Grand Canyon. There are 40 or more locations there, about 15 of which are being worked. The ore carries 60 ounces of silver to the ton and about 75 per cent lead. Some gold is also found, as well as good indications of placer diggings. Bud Dillon and a party of prospectors started for this district yesterday morning.

GOLD.—Prescott *Courier*, May 5: There are 28 free gold bearing ledges in Centennial district, with veins from 2 to 10 feet wide. Mr. Holbrook, an expert from El Paso, Texas, representing an English company, is there looking at the mines of Messrs. Tride, Hayard & Harris, said to be valuable properties capable of running 20 50-stamp mills. About 60 miles from Prescott and about 25 miles from the sink of Date creek are some rich copper properties upon which a St. Louis company intended to erect four 30-ton smelters. A big dam for ranch and mining purposes is to be built on Bill Williams Fork 30 miles above its mouth and five miles from the Planet mine.

TOMBSTONE.—Democrat, May 5: At the Grand Central the excavating for the large engine will be completed in five or six days, when the ground will be opened for the foundation. Sinking in the new shaft will be resumed on Monday or Tuesday. Steam has been raised in the boilers that passed through the fire, and found to be in good order. A temporary engine-house has been erected and ready for work.

GRAND DIPPER.—The shaft has 175 feet of timbering in it. A new station will be opened at 169 feet. The company intends to sink the shaft at the rate of 150 feet a month. The last 12 feet of the shaft has been sunk on a vein about 15 inches wide, of ore that will average from 50 to 90 ounces per ton, and go some 15 per cent lead. This is evidently the Grand Central lode, as their south drift is within 100 feet of the Dipper shaft. Striking this vein was somewhat unexpected.

BOSS.—This mine is looking very well. The stops above the 100-foot level are looking well, some 100 tons having been shipped from them last month. Drifting on the vein from the 200-foot level is being continued.

MAINE.—From 25 to 30 men are constantly employed at this mine. The vein remains about the same, and of the same high grade which has heretofore characterized it.

BISBEE.—Tombstone *Democrat*, May 7: The Copper Queen is working over 100 tons per day, and more ore is being extracted than the smelter will run. As usual this company keeps at least two years' ore reserve in sight. There is now in course of erection a new concentrator, comprising 12 jigs, 4 crushers, and 12 revolving screens, which will be in operation in about 60 days. The new smelter, which will have a capacity of over 100 tons per day, will be erected as soon as possible. Men are now employed on the foundation. This company has about 275 men on its payroll and it is the prime factor in the prosperity of the place. The Czar mine hoist is the only one now in operation, although the Atlanta will probably be started up in the near future.

COLORADO.

CRESTED BUTTE.—*Elk Mountain Pilot*, May 5: The Excelsior mine shipped another car of ore yesterday. It goes to Denver. Work is still progressing at the Eila in Redwell. The ground is softer, the vein wider, and the mineral slightly improved. Mr. Geer went to Pittsburgh last Thursday to look around and see what the prospects were for getting to work on his mines in the near hereafter. He expects to do considerable development work on the Monitor. Mr. J. Mott, of Denver, has purchased the Pioneer stamp mill at Irwin, and will put in some tables as soon as the road opens. He has also taken a lease, we are told, on the Eureka and Ella mining property on Ruby hill for five years, and will do considerable work. The lease calls for the sinking of two shafts, each at least 100 feet in depth. Work has been suspended on the Fairview on Ruby hill for the present. Negotiations are pending looking to a renewal of operations. The Old Lot mine, in the Cebolla district, has been bonded to W. J. Fine and A. K. Stevens, of Gunnison.

COKE.—The C. C. & I. Company here is now burning 150 ovens making coke. Each one of these ovens is charged with 3½ tons of slack coal, and then burned for 48 hours. From each of these ovens, when burned, 2½ tons of coke are obtained. The ovens used are the "bee-hive" pattern and are built in two blocks or rows, with two ovens width of each row.

IDAHO.

THE REDUCTION WORKS AT WARDNER.—*Helena Herald*, May 1: S. G. Reed, the Portland millionaire, is here to perfect negotiations with the Helena Concentrating Company by paying over the purchase price for their reduction works at Wardner, Idaho, and the lease they had upon the Sullivan and Bunker Hill mines. These great ore-producers of the Cœur d'Alene country have been purchased by Mr. Reed at a cost of over \$600,000. The Helena Concentrating Company alone, including Messrs. Hauser, Holter, Esler, Cox and Corbin, receive \$123,000 for their plant and interest in the property. These Helena capitalists went into the project last year, and now withdraw from the enterprise with great profit, considering the amount invested and the period of work. The purchaser of the mines will erect additional works and proceed with the development of the property on an extensive scale.

TIP TOP AND DEADWOOD.—Wood River *Times*, May 5: The Tip Top and Deadwood developments continue to be the talk of prospectors and miners on the Gold Belt. The Tip Top is now opened by a shaft in the ledge which is down 100 feet. At that depth a level is opened which is already 300 feet long. Both shaft and drift are in ore all the way, the vein, wherever crosscut, showing a width of from 10 to 20 feet of free-milling ore, which, at a low estimate, will yield \$15 to \$20 per ton. A tunnel that will tap the Deadwood vein at a depth of 150 feet is to be commenced in a few days. Another development which is exceedingly encouraging is that made on the Benson. This claim is on the same vein as the Tip Top and Deadwood, and might be called an extension, since only

a 200-foot fraction lies between. This tunnel is now in 60 feet, and shows six feet of good ore (supposed to be similar to the Tip Top) in the face.

THE COMET.—Wood River *Times*, May 5: The people of Crichton and Soldier, on Camas prairie, are greatly elated over the developments made in the Comet mine, on Deer creek, in the foothills back of Crichton, by Mr. Schroder, of Soldier. After sinking a 14-foot shaft in the vein, Mr. Schroder drove a 50-foot tunnel from the bottom, and ascertained the ledge to be six feet wide, and to carry free-milling ore that assays \$133.10 in gold per ton.

CAMAS No. 2.—Dr. McKay is showing some rich specimens of chloride and black sulphure ore which he dug with a pick a few days ago, out of the Camas No. 2 mine at a depth of 400 feet.

FLINT.—We hear that not only the Flint and Idaho Mining Co.'s mines at Flint are showing up splendidly, but that private properties are as well. The Old Squaw, Old Judge and Way and Grete's mines are said to contain very rich ore, and that the ledges grow larger, and the ore richer, as work is done on them.

KETCHUM NOTES.—*Keystone*, May 7: The Philadelphia and Idaho Co. has established a rate of \$34 per ton, working charges, on ores to be sent to its works for reduction this season. This is the same figure charged last year. It is anticipated that the full capacity of the works will be called into requisition during the summer and fall, and both furnaces will be put in thorough order. The most important feature of the week's business is the contract made for the receipt of the ore of the Carrie Leonard mine, of Smoky district, at the company's works here. The shipments will amount to about 10 tons per day as soon as the road is opened. The ores of the Dollarhide mine will also come to this point for reduction, and the product of several other mines will also be sent this way.

THE LUCIA.—This property, situated on East Fork, and owned by Theo. Olsen, is showing good results. A tunnel 300 feet in length has been run, and a level extends on the lead a distance of 60 feet, where a shaft has been sunk 50 feet. At the bottom of the shaft a drift of 27 feet has been run. Ore is found all through the lower workings. A small lot of ore from the Quaker City was brought to the smelting works during the week. A shipment of ore from the Noonday mine, in Elkhorn gulch, has been received at the Ketchum Sampling Works. The Occidental, in Greenhorn gulch, under lease to Frank Bynum and Hugh Freelin, is making a favorable showing.

GOLDEN DAWN GROUP.—Cœur d'Alene *Record*, May 7: The Golden Dawn group of mines are looking splendidly, and a sale can be considered an assured fact unless something very unlooked for occurs in future development. The men are now working on the Horseshoe claim, the eastern extension of the Golden Dawn. The ledge is between six and seven feet in width—all clean ore between well-defined walls. The tunnel gains one foot in depth for each foot it penetrates the hill.

DREAM GULCH NOTES.—Lane, Landes & Shields are ground-sluicing on No. 1 consolidated old wash placer claim on the west side of Dream gulch. Considerable gold was taken out of this claim last year, and as they have it well opened, there is no doubt but what they will get plenty of the yellow dust this year. There are a number of big boulders in the claim that have to be blasted to get them out of the way. On the east side of Dream, Wm. Ray and Columbia Jim are working an old wash claim, sending the gravel down from a pit through a chute to where it is sluiced in the gulch. West of Dream, high up on the hill, Mr. Gay is bringing in a ditch for the purpose of working the Gilbert claim.

MONTANA.

THE ARGENTA BONANZAS.—Butte *Miner*, May 2: Hugh McDonnell, who negotiated the sale of the Rena and Golden Era mines at Argenta, returned this morning from St. Louis, having stopped a few days at Argenta on his way to Butte. It is the purpose to push work energetically, and to this end hoisting works will be at once constructed on the Golden Era (the Rena already has a hoist), and the extraction of ore will go steadily on. Both properties show good bodies of high-grade gold ore, averaging, Mr. McDonnell says, \$100 per ton. This, of course, suitable for shipment, and will be shipped to Denver or Omaha, it not being the intention of the company to build a mill at present. There has already been shipped from the Rena something over \$15,000 worth of ore.

BUTTE NOTES.—*Miner*, May 7: Only the day shift is now being worked at the Stewart mine, situated in Dublin gulch. The new shaft in the Cora mine will be completed by Tuesday next. A credible report is in circulation that the Clear Grit will in a few days commence active operations. All arrangements for the starting up of the Hope mine have been completed, powder and all other requisites being now on hand. Robert Walthall, just returned from a trip to neighboring camps, reports a great many more idle men seeking employment than there are here. John Duffy & Co., the lessees of the Speculator mine, are encountering some very fine ore in their recent workings, about five feet in width across the face. James Brogan, foreman of the Elm Orlu, where he has been in practical charge for the last year, has accepted the foremanship of the Original mine. During his superintendency in this camp an accident has never occurred in any of the many mines that have been under his direction, which is as honorable a record as any superintendent can show. A very strong Western smelting company has had a representative in town recently, looking for a suitable location to put up a smelter. The plan in contemplation includes the erection of a large reduction plant. The difficulty of getting iron ore for fluxing is the principal obstruction in the way.

HIGHLAND DISTRICT.—Cor. Butte *Miner*, May 7: I have just returned from the Highland district, about 25 miles distant from Butte. In one dry gulch four men are now taking out dust which averages from \$35 to \$100 per day, and are only using a rocker. There is but little water—not sufficient for sluicing, and it would cost \$100,000 to bring in enough to work the diggings with hydraulic pressure. There are about 12 or 14 new locations made in the quartz locations above the placers. Among them are the prospects owned by E. F. Dunkel, Jere Roach, and W. C. Miller, of Butte. On the lead which has been traced for 600 feet, these gentlemen

have sunk 17 or 18 shafts, and the prospects are wonderful. Only the day before yesterday assays made by Carney and Hand, Max Mayer and Wartenwiler, went \$41, \$13, \$38, \$59 and \$58. Mr. Miller is working the shafts daily with a small force of men. The mineral generally, in this belt of mountains, is composed of quartzite, oxides of iron, galeua, copper staining, gold chlorides and gray sulphures. There are only from 10 to 12 locations made so far in the district, extending not over one mile in length and one-half mile in width.

NEW MEXICO.

KINGSTON.—Cor. Rio Grande *Republican*, May 5: The camp is looking as well as ever, and new properties are joining the ranks of the producers. The Gray Eagle on the South Percha, through the efforts of the present operators, St. Louis people, is developing into a big mine. The Little Nellie group near the Gray Eagle is becoming a first-class property, the ore all being high grade. The Lochiel is producing large quantities of carbonate ore, with the indications for high-grade ore improving as development progresses.

OREGON.

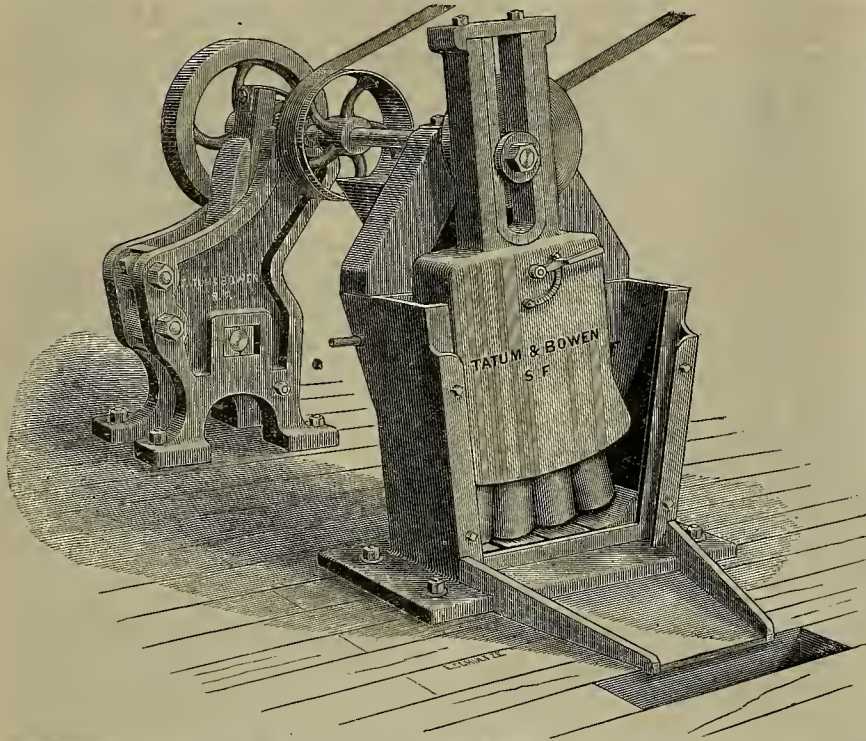
QUARTZ-MILL.—Jacksonville *Times*, May 5: The quartz-mill is again in operation at the Hope mine on Wagner creek, having been bonded by San Francisco parties. Ingram, Baker & Dean, Houston & Co., of Willow Springs precinct, are engaged in cleaning up, with excellent prospects. The loss of Klippel & Daumle's quartz-mill is a serious one to our mining interests, and it is to be hoped that it will be rebuilt at an early date. A ledge five feet wide has been exposed in the Jacksonville Milling and Mining Co.'s tunnel, and it may turn out to be still more extensive. The ore seems to be of an excellent quality, and several tests of it have been made, all of which show the existence of valuable minerals in paying quantities. So great is the body of quartz that even if it pays only \$6 a ton, there is a fortune in it. A correspondent says: Good diggings are being struck on Briggs creek now, Arnett Brothers' claim paying big. Dr. J. T. Ireland, who is working Harry Oviatt's claim, is doing well; also H. Powelson, at the mouth of Onion creek, and Brower & Crockett, at the mouth of Swede gulch, have flattering results. Miners on Galice creek are doing quite well this winter. Excellent prospects, and lots of dirt has been sluiced off. Chinamen on Rich gulch (Ennis & Cameron's claim) are doing well and will make a good cleanup at the end of the season. Walter Simmons surprises himself with a big sack of dust every month or so. Nothing doing in quartz yet; everything quiet.

UTAH.

THE MINES OF BEAVER COUNTY.—Cor. Salt Lake *Tribune*, May 7: Nearly 200 tons of ore will be shipped from here to Salt Lake this week, and are all from Star district, and mostly from the Red Warrior and Mammoth mines; smaller quantities from the Wasco, Stillwater, Rebel and other claims. W. S. Martin has about two carlots of high-grade ore out on the Talisman mine, but will not ship at the present price of lead and silver. This claim is looking well, and the work of development still goes on. The population of Star district has decreased over one-half in the past six months. Most of the old claims are looking well, and ore shipments will continue for some time to come.

PARK NOTES.—*Record*, May 5: As the snow is rapidly disappearing, old-timers are getting up into the hill again to look over their treasure heaps. Among this class is Jim Bowen, who is preparing to make some big developments on his Snake creek property. The Crescent concentrator will be closed down till about the middle of next week, when ore shipments over the tramway will have been resumed. The run made by the concentrator has been most successful, all the old ore supply having been cleaned up. This month's work of the Marsac mill shows a larger and richer bullion product than for any like period before. The record of this mill, working on Daly ore, cannot be surpassed by any mill in this interior country.

REVIEW.—Salt Lake *Tribune*, May 6: For the four months of the present year the receipts of bullion (excluding all ore receipts) in this city have been as follows: January, \$558,148.44; February, \$357,815.23; March, \$425,869.30; April, \$310,632.63; total, \$1,752,485.65. The Ontario output for the four months of the year was as follows: Fine ounces—January, 104,446.49; February, 96,328.29; March, 100,460.80; April, 94,087.87; total, 395,323.45 fine ounces. Ore sales—January, \$60,740.99; February, \$45,718.77; March, \$48,051.92; April, \$49,382.87; total, \$203,895.55 ore sales. An approximate product for the four months of \$599,218. Out of this the regular monthly dividends of 50 cents per share have been paid promptly, making for the four months \$2 a share, or \$300,000. The Daly output for the same four months was as follows: Fine ounces—January, 59,624.19; February, 47,092.62; March, 61,457.12; April, 58,763.00; total, 226,937.94 fine ounces. Ore sales—January, \$17,518.61; February, \$45,065.63; March, \$17,724.66; total, \$39,748.90 ore sales. The bad roads prevented April ore shipments. The above figures give an approximate output for the four months of \$266,685.84. Two dividends, the first of 50 cents per share and the second of 25 cents, have been paid, the first on February 15th, and the second on April 30th. New hoisting works are being put in, and the mine will then be in first-class shape for production. They will be in place toward the latter part of June. The receipts in this city for the week ending May 4th, inclusive, were \$53,900 in ore and \$49,925.81 in bullion, a total of \$103,825.81. For the previous week the receipts were \$116,610.69, of which \$61,618.29 was bullion and \$54,992.40 was ore. The product of the Ontario for the week was 19,040.81 fine ounces of bullion and \$23,363.02 in ore sales, a total of \$43,303.83. The Daly output for the week was 11,079 ounces fine bullion; no ore sales on account of the bad roads. Fine bar receipts for the week were to the value of \$21,798.36; base bullion, \$8357.45. The product of the Hanauer smelter for the week was bullion to the value of \$18,070. The Horn Silver shipped four cars of ore during the week, and was said to have as much more ready to ship.



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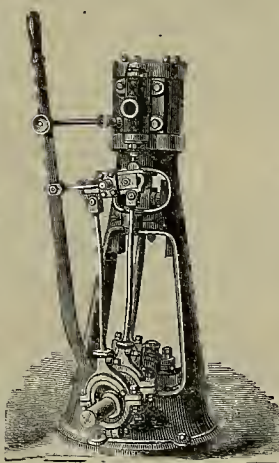
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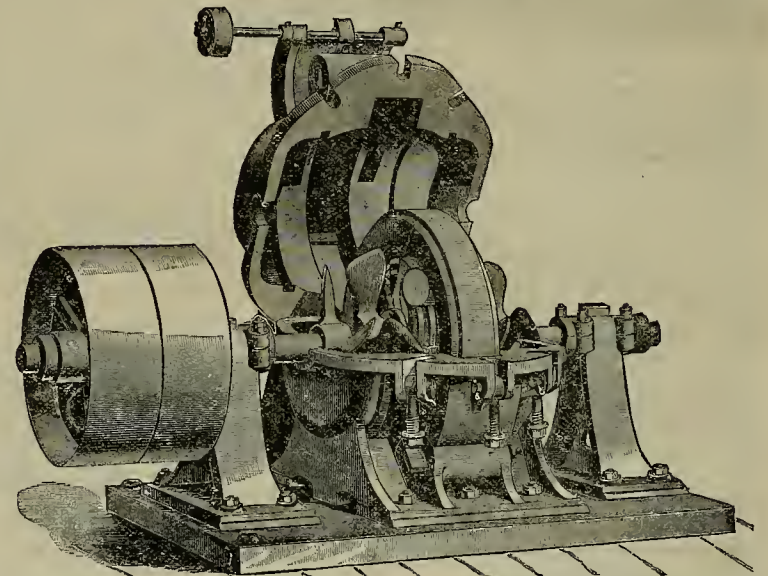
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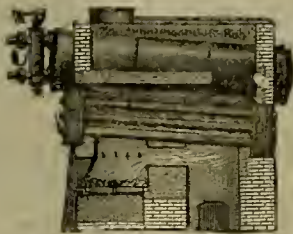
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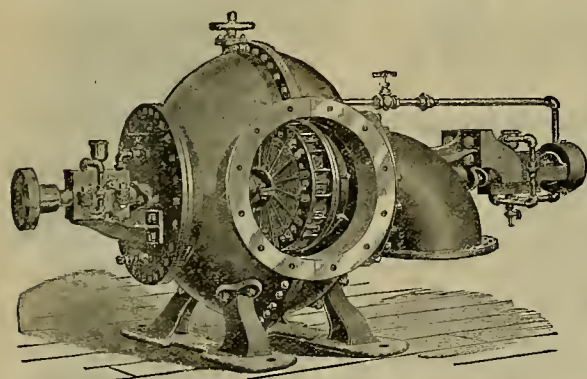
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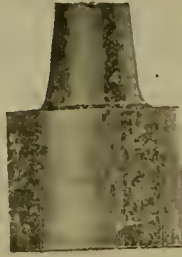
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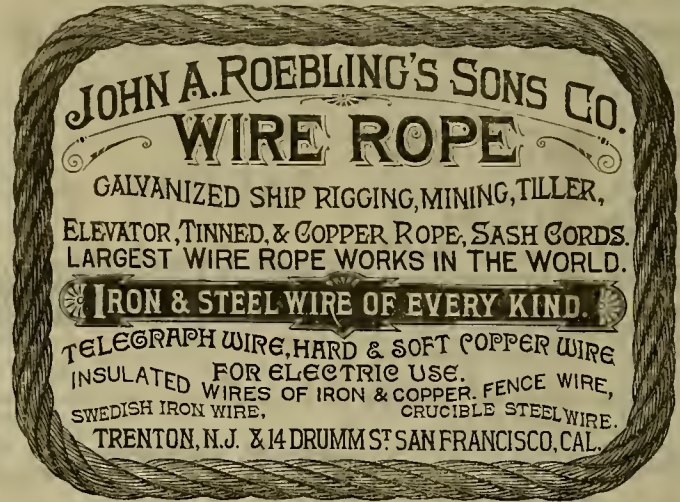
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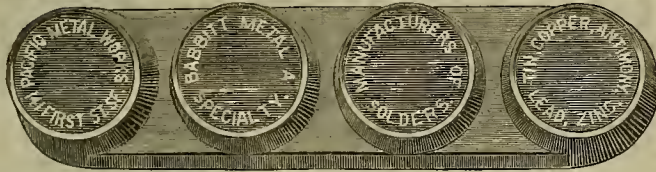
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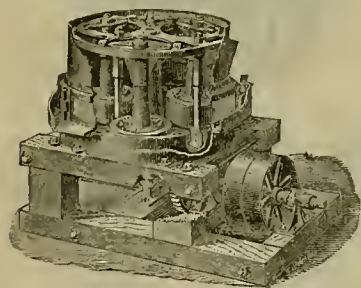
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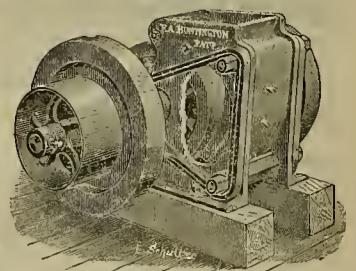
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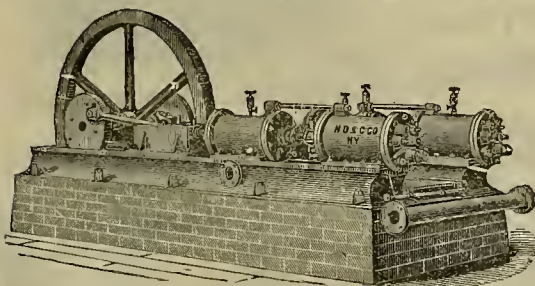
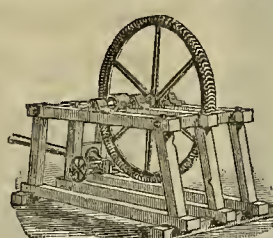
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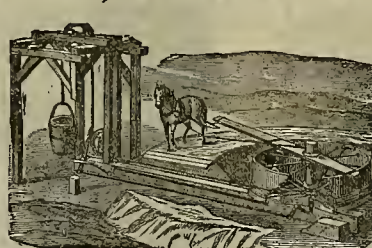
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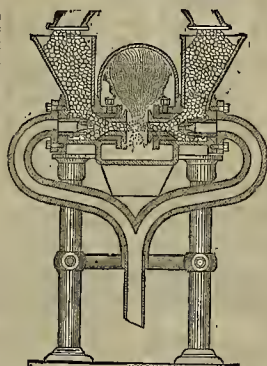
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Of dry super-heated steam, so arranged that they continuously charge themselves with crushed or granulated material, and by the great force and velocity of the steam currents the minerals are dashed against each other with such power of concussion as to cause the hardest ores to be pulverized to any degree of fineness desired. The high temperature of the super-heated steam currents employed, through which every minute particle of ore must pass, causes them to become very hot and dry, which produces a beneficial effect upon Sulphurets and ores containing rusty Gold. The light weight and simplicity of construction of the Pulverizer, the extremely small and inexpensive wearing parts, are the WONDER and SURPRISE of all who witness its operation. The Company is prepared to furnish complete plants for pulverizing

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UP TO 20,000 LBS. WEIGHT.

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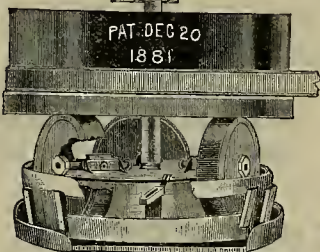
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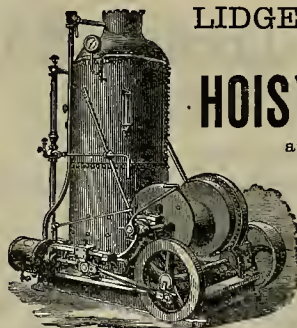
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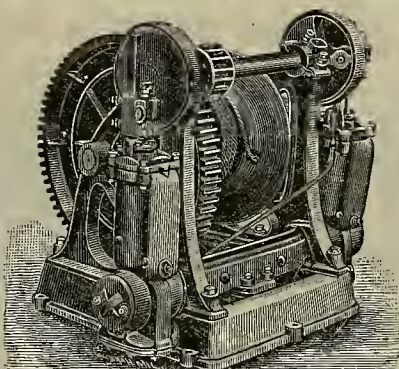
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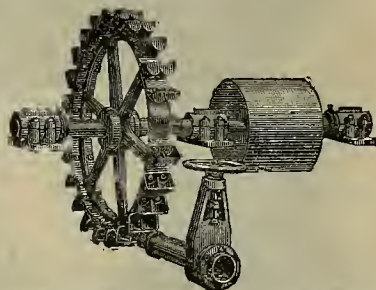
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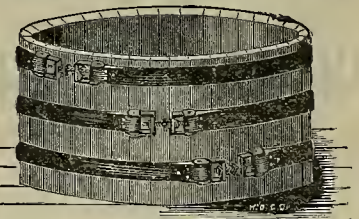
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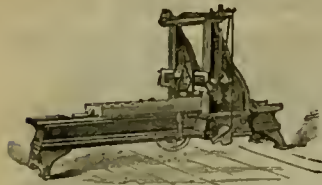
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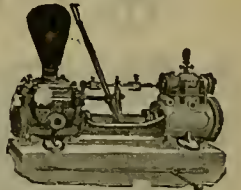


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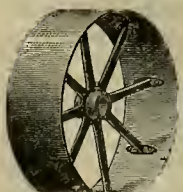
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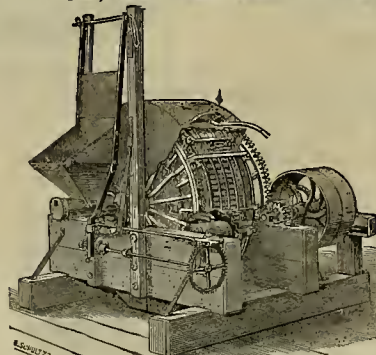
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WORKS ORE WET OR DRY.

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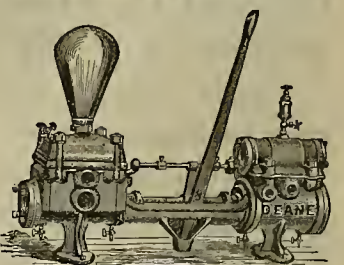
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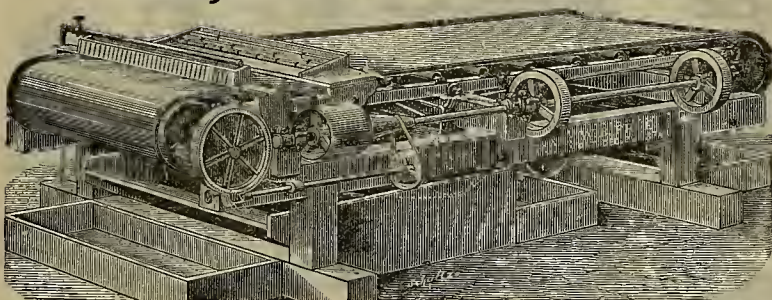
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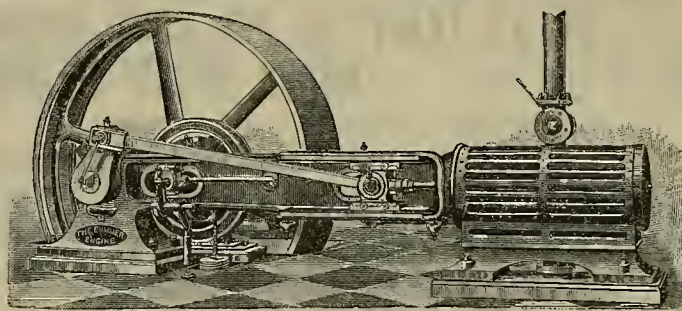
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Shafting,

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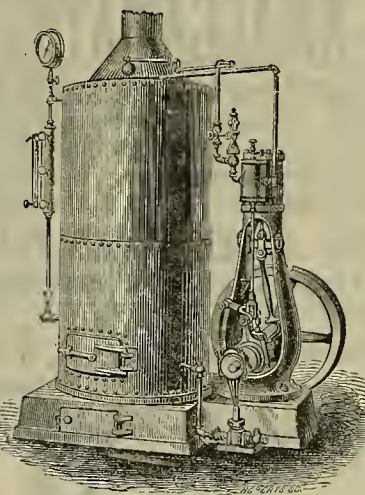
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The Volker & Felthousen M'f'g Co.'s

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"GOLD SEAL" SEAL



RUBBER HOSE,
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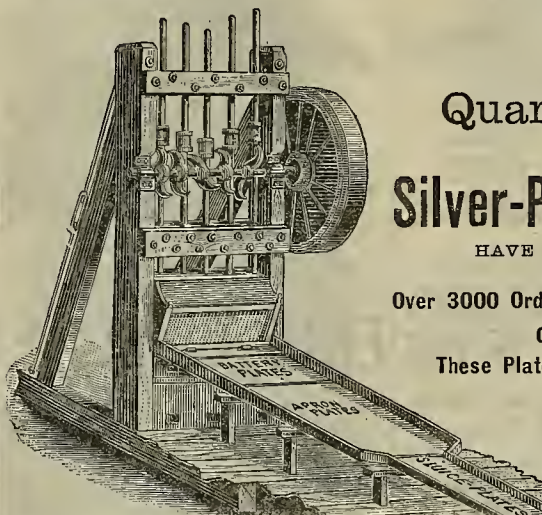
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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, MAY 21, 1887.

VOLUME LIV
Number 21.

Pacific Coast Coals.

Owing to the light demand for tonnages at the port of San Francisco, fewer cargoes of coal than usual have come here from foreign sources, with the result of stimulating production at the coast collieries. Washington Territory sends us the most coal and Oregon follows.

The California mines produce comparatively little. The Mount Diablo coal is mainly used for steam purposes, and the Ions coalfields, Amador county, furnish enough for the local railroad division and domestic consumption in the region where produced. Of course, large quantities come from British Columbia also, as well as from England and Australia.

A new steel steamer is shortly to be built for the Southern California coal trade. She will ply between Port Moody, B. C., and San Pedro, Ballona and San Diego. At the latter places bunkers will be put up. The coal trade of Southern California has increased enormously of late. And this, notwithstanding the fact that crude petroleum has supplanted coal in all manufactures and steam-making around Los Angeles.

The new mines in Oregon are turning out fine coal.

The Oregon Improvement Co.'s coal business this year has greatly increased. The company is now fairly well at work on the new Franklin mine, 33 miles from Seattle, on the Columbia & Puget Sound railroad. Its development has been slow, owing to complications with the Northern Pacific over the lands near which the mine is located. The company is now taking out 170 tons a day, and cannot supply the demand. This is the finest coal ever found on the Pacific Coast. Thorough tests at iron works demonstrated its superiority to Wallsend (Sydney) coal, which is classed as a first-rate coal all over the world. The company is now a large dealer in foreign coals in San Francisco and Portland. Ocean freights to San Francisco are advancing, and the prices of foreign coals have been increased in proportion.

It seems to be a pretty well-settled fact that the Texas, Santa Fe & Northern railroad, the narrow-gauge line running into Santa Fe, New Mexico, from Espanola, and connecting at that point with the Denver & Rio Grande, has been obtained by the latter line. There is now no doubt that the narrow gauge will be extended south from Santa Fe to Corralitos, and there tap the richest coal beds in New Mexico.

R. M. Stevenson, of Bozeman, M. T., is in the city. Mr. Stevenson says that the coal in the vicinity of Bozeman is improving in development, and a railroad is being built so as to place it within reach of the great smelters of Butte and Anaconda.

Electricity in Working Ores.

We have several times of late mentioned the work being done at the Douglass mill, Dayton, Nev., with Dr. Rae's "electric process" of

crease in the cost of chemicals for a silver-mill is twice the cost of treatment and power when this new process is used. In the Douglass mill it has cut down the cost of chemicals one-half, and does better work. The main feature is in the reduction of loss of mercury. It has been tried for a couple of months in the Douglass mill, and is said last month to have effected a saving of some \$5000 over the ordinary methods.

Dr. Rae has just made his arrangements in the East for wire, and will soon be ready to

City Refuse and the Bay.

The city authorities of San Francisco are considering the best means of disposing of the city's garbage and refuse without throwing it in the bay as has heretofore been done. It is about time that this question was brought up. The city people have been opposed to the miners several hundred miles away dumping debris in the rivers which would carry it to the bay and shoal it; and at the same time have been dumping city debris into the bay themselves by the

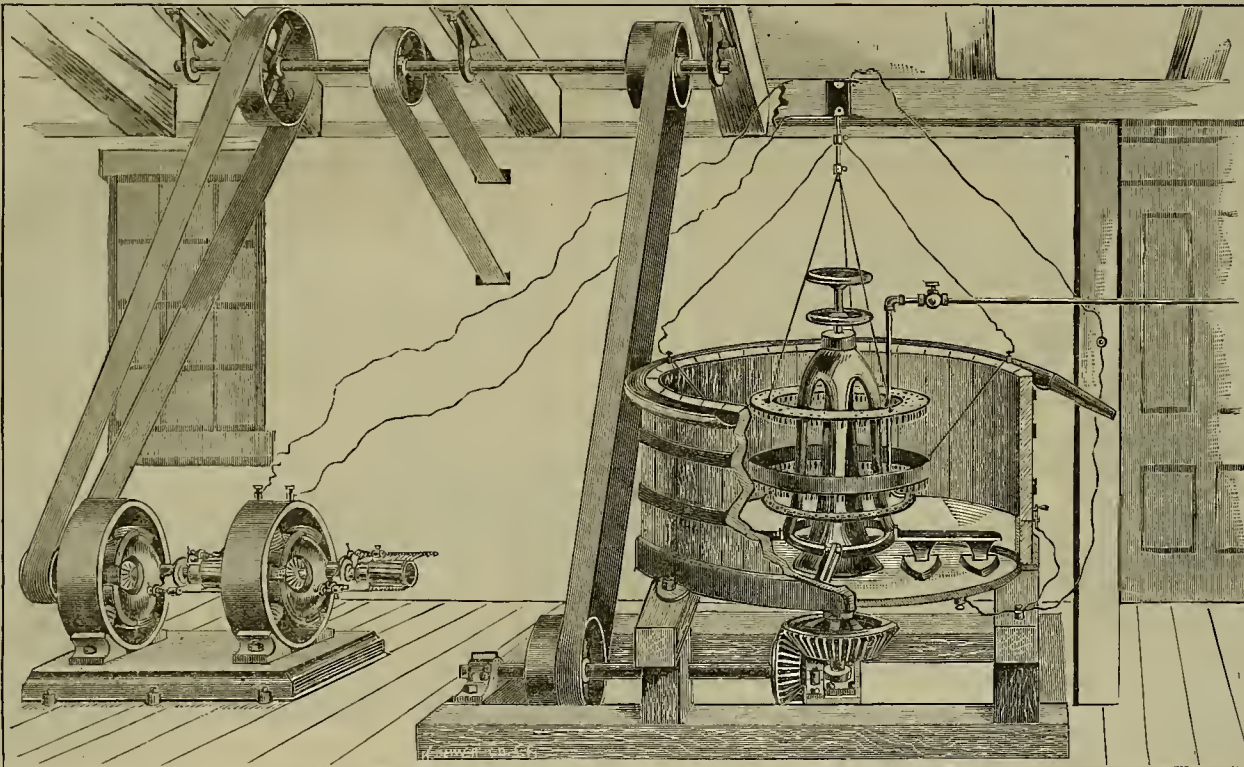
thousands of tons. The city sewers empty their refuse into the bay along the city front, shoaling and filling up the slips between the wharves. Dredgers and steam tugs work all the year round digging the stuff up and carrying it out into the middle of the bay where it is dumped, letting Providence and the tides do the work of ultimate removal. Providence has its hands full looking out for the city itself, and the tides work both ways—in and out. The result is the material from the dumps, the sewage deposits, and the city front mud, thrown into the bay night and day for years, are damaging the harbor.

A new shoal has formed, running from Alcatraz to

Fort Point, and some day a deep ship will bring up on this, and the whole thing will be laid to the miners, who will be made the scape-goats of the city's carelessness.

The whole matter of the disposal of the city's refuse is an engineering proposition. With intercepting sewers to carry the loads of other sewers down to the Golden Gate, and empty the material only on ebb tide, the Pacific ocean could be made the dumping-place. The removal of the garbage and rubbish could be accomplished by scows and tug boats which would take it to the ocean, and not the bay itself. The city front mud should also be carried further away. In some large cities in this country and abroad, the city refuse is burned in furnaces especially adapted to the purpose. We described such a furnace in a recent issue of the PRESS. To be consistent, our city fathers should cease permitting the city refuse to pass into the bay, since they are doing themselves precisely what they condemn others for doing.

J. J. KERMEEN, who has had charge of the Ruby and Dunderberg mine at Eureka, Nev., for several years, has gone to take a position with the La Plata Company, at Leadville, Colorado,



PROCESS FOR WORKING ORES BY THE RAE ELECTRIC SYSTEM.

working ores and tailings. It was at first tried on tailings with a view of recovering the mercury which had been lost. But it has been found even more efficient in working ores by preventing loss of mercury and amalgam.

The engraving on this page shows the appliances used at the Douglass mill. The dynamo is run in the ordinary way by the mill-engine, and the wires are led to the wooden pan in which the ore is worked. One electrical current is applied through the ring anodes and the other current is applied at the bottom. The solution used overcomes the resistance to the electric current. The ring at the bottom is a perforated gaspipe through which passes a sufficient current of water to clean and wash off the lighter particles. Any quicksilver or silver which may float over is caught in the channel or trough encircling the pan, as it overflows. In drawing off the settlers they have only clean material to deal with. For successful work the volt and ampere force have to be carefully adjusted.

The dynamos in use at the Douglass mill are capable of operating seven settlers. Two new ones are being built for this mill to give the full capacity of 16 settlers. The mill works 135 tons of ore per day. It is stated that the de-

contract for the necessary appliances. The plant will be furnished on a royalty or number of tons of ore crushed, the appliances, however, to be purchased. The mechanism is made in this city by the Pacific Iron Works and California Electrical Co.

This process is not new, but the system has just been completed and made successful. Dr. Rae obtained two patents in 1867, one in 1868, one in 1869, and another in 1872, besides the recent patents. The success is really the result of a series of failures which yielded nothing but experience. The recent trials, however, satisfy the inventor and the others interested that the process is now perfect. The English and colonial patents on this electric system of metallurgy have been sold to an English company, and the Mexican territory has also been sold. In a short time the process will be introduced in other mills.

The opening of inexhaustible beds of bituminous paving rock, near San Luis Obispo, is creating a sensation. Contracts have been made for a supply to a Los Angeles company for many thousand tons, the entire work aggregating over \$300,000. It will give work to hundreds of men at San Luis Obispo.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Extraction of Gold.

EDITORS PRESS:—I read with much interest the article of Mr. E. T. Barher, on "The Extraction of Gold," in your valuable paper of March 5th, and his description of the Russell furnace. Having had some experience with refractory gold ores, I will offer a suggestion to your readers that I think will be found an improvement on Mr. Barber's method.

It is this: When ore is put into pans, instead of using quicksilver in pan, use amalgam which is ready to retort and put quicksilver in settler. The amount of amalgam must be varied in accordance with richness of ore, which can be determined in a few charges, but it will be found the amalgam ground with the charge will permeate every part and take up the fine gold, and the amalgam is easily recovered in the settler. I believe this would be an improvement for many free gold ores, when a considerable per cent of the gold is too fine to be caught on the plates. If carefully conducted, I believe 95 per cent of the free gold will be saved. The process is not new, having been used in Old Mexico for a long time, and was described in a paper read before the "Institute of Mining Engineers," of N. Y., in the fall of '85, by C. A. Stetefeldt, M. E.

As I helped make the experiments he referred to, and saw the results, I have great faith in the process. E. C. QUINLEY.

Occurrence of Gold.

NUMBER I.

[Translated for the Press from *El Minero Mexicano*.

The auriferous alluvions of California present different features, according to the valleys where they are observed or the heights where they are found located. The differences are sufficiently pronounced, since Dr. John B. Trask has referred these alluvions to distinct epochs in a report which he made in 1856 to the Government of the United States concerning the exploitation and situation of the gold mines of California. This geologist considers one class more ancient than certain tertiary lands in Vermont described by Professor Hitchcock, the other as nearly contemporaneous with these lands. It may be that the variations indicated by Dr. Trask correspond with little difference in age to the phenomena of the terraces which the ancient alluvion lands exhibit in France in the valleys of the Pyrenees. These terraces present among themselves a relative antiquity, but they correspond to a singular phenomenon which has had successive phases characteristic of the diluvial epoch. This shows that the existence of alluvions in different epochs are not always variant, since we have two examples in Auvergne. Observation seems to indicate that the same happens in California, as there the volcanic fragments which are frequently found in the auriferous alluvions are never found on the surface, which effectively denotes two distinct alluvial epochs. The one made at the expense of the lands that contain the veins of gold should be anterior to the volcanic rocks which jut out in the valley of the Sacramento; the other should be posterior to the eruption of these rocks. The separation of

These Two Alluvial Epochs

Is very noticeable in Minnesota, in the opinion of Dr. Trask, expressed in the report upon the geology of the coast and a part of the Sierra Nevada, submitted to the Assembly at the session of 1854. The alluvion land there reveals considerable thickness. The remains of rocks and volcanic tufas cover the surface, and form a stratum of great strength, under which is found a stratum of sand 600 feet thick, of a different nature and of fragments of rocks without the least appearance of gold. The imperfect argillites form the third descending stratum, establishing the separation of the ancient and modern alluvions. A fourth stratum, of transport rocks 35 feet thick, follows the clays; this is composed of sand and pebbles of hyaline quartz. A particular circumstance in connection with this stratum is, that it contains a great quantity of silicated wood, between which, Dr. Trask notes, the existence of points in a siliceous state. Subordinate to these strata the alluvial portion is found. Although it is not exploited in exactly the same scarp, one could not fail, says Dr. Trask, to recognize the identity. This is proved by the persistence of the same silicified wood as abundant in the gold lavages of Minnesota as on the summit of the mountains.

These Alluvions

Rest upon rocks of granite and porphyry. Dr. Trask points out an interesting relation between the nature of the alluvions and the soil of the valleys in which they are fixed. In Minnesota the sand which accompanies the mud is siliceous, and the pebbles of quartz are numerous; the gold is, moreover, alloyed with a small proportion of silver; the lentejuelas or spangles of gold have likewise a certain thickness. In the northern valleys the sand is mingled with many angular fragments of slate and of serpentine. The gold, of a whitish

color, is alloyed with a greater proportion of silver—in fact, the lentejuelas are always small and the pepitas very rare. The gold lavages of the northern valleys contain, moreover, a large quantity of fragments of arsenical iron, and an assay of this mineral has shown that it is very rich in gold. The

Differences

That we have pointed out between the nature of the auriferous alluvions of California not only make known that gold exists in different lands, but that the veins of this metal which pertain to these lands do not present the same conditions of age and of formation. The deposition of gold in California, so noteworthy for the richness and abundance of the filones, will be of particular interest to science.

The Auriferous Veins

Are produced in two distinct conditions. The greater number form the filones, very clean, with proportional strength or thickness, and a quartzose matrix always similar. The others constitute veins more or less numerous, ramifying between themselves. Each one of them, considered separately, is in reality a filon, but irregular. The irregularity disappears on examining the dispersion of the metal in the split or hurstled rocks, when it will be seen that this group of veins forms by its union a true filon. It is very difficult to give absolute reasons concerning the relative age of these two classes of auriferous veins. However, Dr. Trask has distinguished them by the names "ancient" and "modern." The veins of the first category form three distinct parallel bands, located upon the western part of the Sierra Nevada, including in their union an extent of 11 miles. The first, the most eastern, is distant from the second at least four miles and is found in the same chain. The filones which pertain to these two first zones penetrate the granite, the porphyrys and the serpentines which compose the mountains of the Sierra Nevada, and are prolonged in the most ancient trap rocks. These ancient filones are regular and uniform to a considerable extent. The quartzose gangue constantly preserves the same aspect; the gold is there disseminated by nests and sometimes forms small masses or plates. The matrix, closely adherent to the rocks, is brittle, is separated with difficulty, and occasionally breaks when penetrated. They are frequently decomposed. The exploited filones, above all those noted for their opulence, belong to the most ancient group; they are situated principally in the counties of El Dorado, Placer, Nevada, and in a part of the county of Yuba, at a short distance from Scott's Ferry. In this last county, filones, which belong to the modern or recent group, have been examined; these cut and disorder the first, a disposition which establishes their posteriority.

The filones which belong to the third zone appear according to all their distinctive marks, and notably with relation to their parallelism, to be of the same epoch as the first, but farther from the principal chain, the lands which they cross being very different. The rocks here dominant are the talcose slates. The filones cut the strata in a distinct manner, but an arrangement is always observable, that makes a remarkable difference when the filones are attentively considered; it is, that this variation of the slates extends to a distance much greater than that of the filones which pass through the granite. The quartz, which serves as a matrix to the gold, is, moreover, infiltrated in the clefts and in the strata of the slate in the form of indurated, tangled thread. The result is, that at the first impression, one recognizes less easily the origin of these filones, and determines with difficulty their thickness; but when they are observed for a certain length, a mile, for example, their regularity is confirmed, and one is then sure that they depend on the group of ancient filones. The last observation made by Dr. Trask, which it is necessary to point out, is, that these filones never extend into the tertiary lands, that have not decomposed them, and which are consequently of an anterior formation to said lands.

The filones of the second group are distinguished by a regularity less pronounced than those which characterize the more ancient filones. They are often divided into small branches, in which the potency or thickness is lessened to one inch. They do not always compose that form designated stock-work, by which the massed ore is worked in chambers or stories. The branches into which the filones of the second group are divided, affect by their conjunction the direction which characterizes them. This is, properly speaking, a band of intruded rock enriched the length of the walls of the filones by a dispersion of auriferous quartz; but these veins are, so to say, perceived by multiples for some lengths; such a one is that which has been exploited near Centerville, in Placer county, which includes in a direction north and south more than a mile and a half. It crosses successively the granite, the lustrous blue talcose slates, and the trap rocks. Finally, that which fixes its modern age, is, that it cuts and separates a vast filon belonging to the first group.

(To be Continued.)

WE notice that the artist of *Puck* has recognized the merits of the Rand drills, by placing one of them in the hand of the President for political road-making in their leading cartoon of the last issue.—*Salt Lake Tribune*.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

WAGON-REACH.—A. Singer, Lovelock, Nev. No. 362,231. Dated May 3, 1887. This wagon-reach consists of the double-jointed or hinged reach, the object of which is to avoid strain on the reach and allow for the motions of the wagon in passing over uneven ground. The reach adjusts itself to all the movements of the wagon.

DRESS CUTTING CHART.—Thos. Hswkins, S. F. No. 362,378. Dated May 3, 1887. This dressmaker's chart consists of a series of forms with measures and figures for outlining the different parts of the garment and obtaining the correct sizes, and the combination or condensation of these forms upon one or two sheets so as to simplify the work and reduce the number of charts necessary.

EMBROIDERY FRAME.—Charles Schaubel, S. F. No. 362,230. Dated May 3, 1887. This invention relates to that class of frames specially adapted for holding under tension and in proper position material for receiving embroidery work, painting or repairs, or additions of various character; and the invention consists in the peculiar and novel means for readily tightening and holding under tension the material to be worked upon. The means for tightening can readily be applied and the material cannot be injured.

VISE.—Edward H. Farmer, Gilroy, No. 362,262. Dated May 3, 1887. The invention consists, in combination with the vise jaws, one of which has a slotted back, of a bolt pivoted within said back, whereby it may be extended for use in securing the vise or dropped down out of the way, and a nut on said bolt. The object is to provide a vise which may be readily connected with any convenient support; if in a workshop with a bench or framework, or if in the field with any suitable portion of any larger implement, as the wheels thereof, so as to furnish for the vise a firm support.

CAR-WHEEL.—Wm. H. Masterman, S. F. No. 362,292. Dated May 3, 1887. The invention relates to an improvement in car-wheels and axles for the purpose of relieving the friction and strain which occur where both wheels are rigidly secured to the opposite ends of a single axle for railway cars. It consists in forming a journal upon one end of the axle separate from and independent of the journal which turns in the boxes, and in fitting one wheel to this supplemental journal so that it may turn slightly in passing curves or other points where necessary.

SULKY CULTIVATOR.—Ira B. Kilgore, S. F. No. 362,286. Dated May 3, 1887. The entire tooth-carrying frame is of simple construction and the main bars are all of gaspipe. The cultivator teeth are all in front of the driver's seat. The teeth are easily raised to the desired height and kept at any distance required. By operating a lever, the wheels may at once be turned to an angle with the previous line of travel, thereby throwing the tooth-carrying frame around, and this movement will enable the machine not only to turn the corners, but also to turn temporarily out of the way of any projection or obstruction on the line of travel.

BOOK SUPPORT.—Peter O. Peterson, S. F. No. 362,226. Dated May 3, 1887. This invention relates to that class of furniture attachments in which a flat piece or table-top is attached to the end of a swinging bracket, and is so mounted that it may be brought within reach of the operator, and may be used when flat as a table, or may be turned to any desired inclination, and there be held so that it may serve as a writing desk, or with the assistance of an adjustable strip at its base may serve as a reading stand. This invention consists mainly in the supporting frame to which the top is hinged, and upon which it rests, and the pivot connection of said supporting frame with the main swinging bracket.

RAISIN-STEMMER.—James Porteous, Fresno, No. 362,228. Dated May 3, 1887. The invention consists in an outer-fixed open-ended truncated cone, arranged in a perpendicular position, a fixed hopper in communication with the upper end of said cone, a rotating inner cone perpendicularly arranged, the apex of said cone extending into the hopper, and its body working within the outer cone, said inner-rotating cone having a diameter enough less than the diameter of the outer-fixed cone to leave an annular space for the passage of the raisins. The invention further consists in the adjustability of the inner-rotating cone, whereby the capacity of the raisin passage is varied, the means for accomplishing this adjustment while the cone is in motion, the peculiarities of the raisin passage between the two, and certain details of construction.

VINEYARD WEED-CUTTER.—James Porteous, Fresno, No. 362,227. Dated May 3, 1887. This is one of that class of agricultural implements which are employed for cutting weeds and which have a flattened V-shaped blade or knife, adapted to travel under the surface of the ground, thereby cutting off the weeds.

The object is to provide an implement which, by reason of its peculiar general construction, is well adapted for use in vineyards, where the low overhanging and spreading tendrils and other vegetation of the vines prevent any ordinary cultivator or weed-cutter from working close to the stems or stocks of the vines and eradicating the weeds. The invention consists in an implement, the entire framework of which is narrowed down to a minimum, and carrying a V-shaped blade or knife, the wings of which project far enough on each side of the narrow framework to reach under the vines and near to the stems or stocks, the framework, by reason of its construction and position, avoiding the tops.

BALANCED PULLEY FOR CABLE RAILWAYS.—Warren Dunham, Igo, Shasta Co. No. 362,258. Dated May 3, 1887. This invention consists in a peculiarly constructed cable-supporting pulley, the object of which is to prevent accidents by reason of the traveling grip coming in contact therewith. In cable railways the traveling cable from which the car, through its grip attachment, derives its motion, is supported within its tube upon pulleys from which the grip raises the cable as it passes, and thus avoids interference. These pulleys are usually fixed in position, and it will be readily seen that if the grip should come in contact with one of them, there would be serious injury; but by making the pulley yield to the grip and return to position after it has passed, there can be no accident of this character. Mr. Dunham's "accommodating" pulley is of peculiar construction, and has curved guard-rims or flanges.

CONDUCTOR'S TIME OR TRANSFER PUNCH.—Solomon Adler, S. F. No. 362,240. Dated May 3, 1887. This is one of that class of punches to be used by car-conductors to indicate upon a ticket a fact or series of facts, the knowledge of which is important. The object is to provide for the proper issuance and use of what are known as transfer tickets. These are issued at points of transfer by the conductor, and usually under the conditions that they are good only at that point and for that trip; but these conditions are not observed by the traveling public, and their use is by no means confined to the continuous trip for which they are issued. The abuse of the tickets by the public naturally leads to abuse by the conductors in their issuance, and as a consequence it not unfrequently happens that the tickets are used as currency in a great many shops and places. This new punch will avoid these abuses, since it will indicate upon the transfer ticket itself the exact time when it is issued, or the time up to which it is good when used, in connection with a rule of the company, limiting the use of the ticket to a certain number of minutes or other specified short time after its issuance, or up to the time indicated.

WHEELS FOR WATER-POWER.—L. A. Pelton, while upon the Comstock, says the Nevada Transcript, made arrangements introducing his hurdy-gurdy water wheels into use at the Con. California and Virginia mine for purposes of hoisting and milling, in place of the steam-power now in use. The latter is quite expensive, wood costing at that place \$15 a cord and engineers' wages being very high. To furnish the power for the machinery, four of the Pelton wheels, each 11 feet in diameter, and weighing about 4500 pounds, will be used. The shaft is 2000 feet deep. One of the wheels will be placed at its surface, a second at a depth of 500 feet, a third at a depth of 1500 feet, and a fourth at the bottom of the shaft, or 2000 feet below the surface. The water which propels the surface wheel will have a fall of 500 feet, then pass on down from one wheel to the other, and after doing service for the lowest, pass off through the Sutor tunnel. From three to four million gallons of water will thus be used each day. The power will be transmitted from one wheel to another by a series of wire rope belts. Each wheel has a capacity of 250-horse power, and the connections will give the surface wheel, to the shaft of which the machinery is attached, 1000-horse power. The wheels that go into the shaft will be made in two parts each, and will be put together at the stations where they are to be located.

GOLD IN NEVADA.—For many years the gold mines in Hawthorne district were neglected because the appearance of the ground was not that in which experienced miners were accustomed to find gold. During all that time, and since, Garfield has been regarded as a district in which no gold could be found. It was taken for granted that the district was exclusively silver producing, and no search was ever made for gold. Recently in the Iron Horse a ledge, carrying a fair percentage of gold, has been discovered, and in the ore taken from the Honest John there are several dollars in gold to each ton. May it not be possible that the usual order will be reversed in those mountains, that is, that the silver ledges may change into gold ledges? At least it will not be surprising to learn that some lucky prospector has found a gold ledge in Garfield, and if such is found and it is fit company for the silver bearers, the owners will need a mint on the ground. Gold is where it is found and there is no telling what might happen if some prospector would go over Garfield with a mortar and pan.—*Walker Lake Bulletin*.

ORDERS have been received at Vallejo to commence work on the Hartford.

Pacific Grove Retreat.

The burning of Hotel del Monte, which has been widely heralded, has awakened public interest in the steps to be taken for the restoration of the attractions the fame of which has become world-wide. We understand that work is rapidly progressing which will, in a few months, result in a new and much improved Del Monte. The immediate effect of the loss of the great hotel is to call out into more prominence the twin attraction of Monterey, the Pacific Grove Retreat. Our readers have seen frequent allusions to this seaside beauty-spot, as the seat of the California branch of the great Chautauqua University, and as the gathering place of leading religious assemblies. Fortunately before the Del Monte fire there was approaching completion a new hotel at Pacific Grove which now comes forward to serve those who desire to resort to the environs of Monterey during the present summer. Our engraving on this page presents, in a very acceptable manner, the beauties in and around Pacific Grove as they now appear, including recent improvements, and therefore superseding previous sketches.

On a promontory one mile west of Monterey, covered with pines and clumps of oak that would gladden a Druid's eye, is located the now famous Pacific Grove Retreat, the Seaside Camp-ground and Christian Seaside Resort. The encampment commands a magnificent view

and popular place of resort. Mr. Schonewald will make every provision for the entertainment of those who seek its hospitality, and the tanks at "Del Monte" will be placed at their disposal, together with the clubhouse and stable. The opening of the El Carmelo at this time is most opportune.

This picture shows that Pacific Grove is quite like a metropolis with its superb hotel, bathing pavilion, streets, avenues and houses. So far as nature has a chance, this place is now in its gayest attire. The bay, the beach, the bathing, are all fine; the trees are in full leaf, the grass is soft and green, wild and cultivated flowers are in profusion, the music of the mocking-bird and linnet greets the ear in all directions, made more melodious by the haritone of the ocean's waves. "See Naples and die." We had rather pass a few days at Pacific Grove and live.

GOLD IN MONTEREY COUNTY.—A report has been brought to San Luis Obispo of the discovery of gold in the mountains bordering on the coast in Monterey county, just north of the San Luis Obispo county line, the immediate location being the San Carpojoro rancho, which is reached by travel only from this county. The find is a short distance east of what are known as the anthracite coalfields of Monterey county, and is in township 24 south, range 7 east. The gold discovery was made by an old-timer named Cruikshank, who, while working

The New Ore Rates.

Salt Lake amelter men and local miners interested in Idaho and Montana mines are looking with careful countenances at the Union Pacific's new tariff sheet, giving the following rates on silver-lead ores:

From Shoshone, Huntington and intermediate points on the Wood River branch north of Shoshone, to and including Ketchum, to Kansas City, \$21; Omaha and Council Bluffs, \$20; Denver, \$17; Ogden and Salt Lake City, \$15.

From all points in Idaho and Montana on the Utah & Northern Railway, all points on the Montana Union Railway and points on the Northern Pacific Railway, between Garrison and Helena, inclusive, to Kansas City, \$13; Omaha and Council Bluffs, \$12; Denver, \$10.60; Ogden and Salt Lake City, \$8.60.

From Park City to Kansas City, \$11; Omaha and Council Bluffs, \$10; Denver, \$7; Ogden and Salt Lake City, \$4.

From all stations on the Salt Lake & Western Railway to Franklyn, Germania, Sandy and Salt Lake City, \$4; Denver, \$10.60; Kansas City, \$14.40; Omaha and Council Bluffs, \$12.40.

It is argued, if this is not discrimination against Salt Lake City, what is it? For \$2 per ton, ore is carried nearly 700 miles, in order to favor the Denver smelters, while from Ketchum Shoshone points to this city, 250 to 300 miles, \$15 per ton is charged. A mining

Comstock Bullion Product.

The Assessor's official statement of the bullion product of the mines in Storey county Nev., during the quarter ended March 31st, is as follows:

Consolidated California and Virginia—Ore extracted, 34,206 tons; value per ton, \$22.40; gross bullion yield, \$766,063.98; cost of production, \$463,015.67.

Savage—Ore extracted, 259 tons; value per ton, \$18.54; gross bullion yield, \$47,829.18; cost of production, \$45,620.70.

Halo and Norcross—Ore extracted, 245 tons; value per ton, \$12.48; gross yield, \$3057.78; total cost of production, \$3231.23.

Crown Point—Ore extracted, 6781 tons, value per ton, \$8.35; gross yield, \$53,471.72.

Kentuck—Ore extracted, 1408 tons; value per ton, \$15.13; gross yield, \$21,297.30; total cost of production, \$21,125.90.

Yellow Jacket—Ore extracted, 14,725 tons; value per ton, \$9.55; gross yield, \$140,670.57; total cost of production, \$201,382.59.

Overman—Ore extracted, 1945 tons; value per ton, \$8.58; gross yield, \$16,680.61; total cost of production, \$17,828.56.

Belcher—Ore extracted, 6781 tons; value per ton, \$8.35; gross yield, \$56,615.59; total cost of production, \$53,471.72.

COAL AT VERDI.—County Commissioner Merrill, of Verdi, informs a Reno Gazette reporter



of the bay of Monterey and the variegated scenery that environs it. The general arrangements of this watering-place are based upon the principles guiding those of the Eastern States, especially the one held at Ocean Grove, in the vicinity of Long Branch, N. J. History is full of surprises. One mile from the spot where Father Junipero Serra, the best-known and noblest of the Franciscan missionaries, landed and took possession of the country in the name of the King of Spain, chanting the Te Deum and scattering holy water, a new race and people have come, with quite another shape of religion, and made the place notable for rest, health, prayer-meeting, missionary and Sunday-school conventions.

The quiet of this sylvan retreat has recently been broken by the land boom. The voice of the huyer is heard in the grove. The fever for eligible sites has invaded the calm and shady retreat. The great number of visitors during the summer of 1886 was the first decided thrill of prosperity that determined what this place shall be, and from month to month has witnessed new and cozy homes in all portions of this beautiful spot. Avenues and streets are being constantly opened and improved by the Pacific Improvement Company, and also by private individuals.

El Carmelo is the name of the hotel lately erected by the Improvement Company at Pacific Grove, and which has already been opened under the management of George Schonewald. It is a thoroughly complete building in all its interior arrangements, and will have elegant accommodations for upward of 200 guests. It will be kept in splendid style, and no pains or expense will be spared to render it a pleasant

in the hills, struck a lead of quartz, and, following up his luck, found the quartz to be rich with the precious metal and containing considerable free gold. Cruikshank, on the day following, communicated the matter to Captain Thorndyke, the lighthouse keeper at San Simeon, who obtained the services of a mining expert named Todd Smith, and repaired to the San Carpojoro rancho. Some quartz was pounded out in a rude hand mortar, and a small quantity of it gave about \$50 worth of gold. The ore is the richest the miners have ever seen, and the men have already formed a company. Last Saturday the reports reached San Simeon, and Sunday morning saw an exodus of men and boys, all eagerly traveling toward the goldfields on foot and by saddle horses. It is proposed to bring the ore down from the Cruikshank mines by pack mules to San Simeon, where it may be shipped to San Francisco. Great excitement prevails in the northwestern portion of the county over the speculative reports. The region where the mine is located contains but few habitations and is on Government land.

At the Anaconda copper smelters, Montana, labor-saving machinery has been introduced and the effectiveness of the works increased in many ways, while the cost of operation has really been lessened. The works are now in the best possible condition to meet the most active and bitter competition. There is also a well-founded report that the percentage of silver in the Anaconda ore increases with the depth. Altogether the Anaconda works are now in a favorable position to meet the attacks of competition.

man, speaking of this yesterday, said that if this city had half the business energy of Denver, such an inequality would not be tolerated. Salt Lake City ought to build a narrow-gauge road on its own account to the Wood River region; then ore could be brought in for what it should be—\$6 per ton. Then the idea of carrying ore from Montana to Denver, with re-shipment at Ogden, for \$7, \$8 less than from points on the Short Line and 100 miles' further haul. Of course, by doing this, bullion for the Omaha refineries is shipped from Denver over the U. P. road. It is prophesied that when political power is stripped from the church something effectual can and will be done to change this state of things.—Salt Lake Tribune.

MESSERS. R. P. McCORMICK & Co., of Kansas City, Mo., contractors for the double-track railroad tunnel, at Kansas City, Mo., 1000 feet long, have placed their order with the Ingersoll Rock Drill Co., of New York City, for a complete plant of tunneling machinery, comprising one Straight Line air compressor, one air receiver, seven Ingersoll tunneling drills, with columns, mountings, boilers, etc. Messrs. McCormick & Co.'s contract requires the completion of the tunnel within 90 days.

EASIER THAN DIGGING.—A dispatch from Tucson, A. T., dated the 9th, says: A party that has just returned from the Santa Catalina mountains report that a good effect of the earthquake is the opening of two large gold veins which were discovered in Santa Catalina mountains at the point where the whole side of the mountain slid down. Several prospecting parties have left here to locate water and claims.

that it is highly probable the coal discovered there several years ago will be prospected by a company of capitalists during the coming month. Two layers or beds of the coal crop out of an embankment of the Truckee river about three-quarters of a mile west of the town. Some work was being done on the "find" when a Mr. Martin bonded that and adjoining properties for three years. The properties thus bonded cover an area of probably 2000 acres, and the sum for which the bond calls is about \$45,000. The coal is said to be of good quality, especially for the manufacture of gas. What its character may ultimately prove can only be determined by development work.

EFFECT OF THE INTERSTATE LAW.—Mr. Williams, superintendent of the Copper Queen Smelting Works, says that he will buy his coke either in England and ship via Cape Horn to Guaymas, or in Tennessee and ship to New Orleans and thence to Guaymas, and in bond to Arizona, as he cannot afford to ship the coke by rail from any distant point in the north or east to Arizona, owing to the effect of the Interstate Commerce law on long and short haul. Mr. Williams also says he will ship his bullion to Nogales, and thence in bond through Mexico to England, to evade the Interstate law, instead of as heretofore by New York.

A DISPATCH FROM VICTORIA, B. C., dated May 9th, says: The steamer Woodside arrived from the west coast yesterday, having on board a number of Chinese miners from Bear river, which empties into Nookta sound. They brought between \$25,000 and \$30,000 in gold dust.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO:

Saturday Morning, May 21, 1887.

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Passing Events.

The latest gold excitement in this State is in the southwestern part of Monterey county, not far from the San Luis Obispo line. Nearly all the people of Cambria have gone there to locate claims. Samples of ore are said to be rich, and there is quite a rush to the new district. If good quartz mines are found there they will be nearer the coast than any so far found in the State.

The proposed new water-mills on the Comstock, when at work, are expected to greatly reduce the cost of working ore, thereby helping out the low-grade mines.

Petroleum is now being very largely used as fuel in this State, especially in Southern California, where most of the steam users are applying it. A number of institutions in this city are also now using this liquid fuel.

The oilfields of California are becoming more important every year. This season there is considerable prospecting being done, and at a number of places boring is going on.

A very important event for this State was the laying of the corner-stone of the Leland Stanford Jr. University, on Saturday last. This institution is destined to be of great benefit to the educational interests not only of California, but the United States.

Beginning to Yield its Fruits!

The so-called Alien Act, the leading provisions of which, with some comments thereon, were published in a late issue of the PRESS, appears to be yielding its bitter and unpalatable fruits sooner and more abundantly even than was expected. From every quarter we hear steadily increasing complaints of its operations, save only from those outside countries which, instead of being hurt, are likely to be greatly helped by such operations. Being confined to the Territories, it was thought at first that this law would have the effect to promote the sale of mines situated in California and other of the mining States, in which view the owners of this class of properties were beginning to congratulate themselves on the advantages that would thence accrue to them. But in this they are likely to be disappointed. Foreign investors are not only disgusted at this sort of legislation, but it awakens in them a feeling of distrust as to the future. If they are to be excluded from investing in the Territories, why may they not be from the States as well? If Congress, through inattention and haste, as in this case, may pass, or suffer to be passed, a law so manifestly impolitic and uncalled for, why may they not in like manner pass others equally wanton and absurd? So reasons the intelligent foreigner, and, fearing for the security of his investments here, naturally seeks a country where they will not be exposed to being so endangered or tampered with.

But even were it otherwise, were the effects of this law favorable to California, she has no desire to profit at the expense of her neighbors. Our miners are not in so great need of financial aid from abroad as are those resident or owning mines in the Territories. With us this industry is further advanced; we have more home capital. Our mines, as a general thing, are more easily opened and equipped than is the case in these newer countries; wherefore, the mining interest here will not sniffer so much from this shutting out of foreign capital as will that of Arizona, Utah, Idaho and Montana. In these Territories, negotiations, before pending for the sale of mines abroad, have been abandoned, with little chance of their ever being renewed. These sales, had they been consummated, would have involved the expenditure of many millions, all of which will now be lost to these countries.

Meantime, Mexico, South America, India, Africa and other distant regions are reaping the benefit of our insane legislation, a great impetus having, since this Act took effect, been there imparted to the business of mining. Parties from Mexico tell us that a greater influx of English capital, owing to this cause, is already noticeable throughout all the northern and northwestern States of that republic. That the late dispatch by the English of so many mining expeditions to South Africa has been due in part to the rebuff they have met with here, may reasonably be supposed.

By one of the provisions of this Act, if ever it should so happen that more than one-fifth of the shares of any mining company shall come to be owned by foreigners, the mines of the company, if situated in any of the Territories, are forfeited to the United States. Was there ever a thing more preposterous than that? This is equivalent to preventing such company from selling their stock at all, since if they venture to do so they cannot by any possibility guard against its falling into the hands of these dangerous people. What better plan for imperiling the property of a mining company seeking to sell its shares could have been devised than this? Certainly no company terrorized by this law could feel safe in allowing more than 20 per cent of its capital stock to pass beyond its control. Should they do so, and the excess come into the possession of the barbarians, then would it become the duty of the public prosecutor to bring suit against the company and have their property confiscated by the General Government. Could fatuity further go than this? It would not surprise us were there to be some inquiry as to the votes by which this extraordinary bill was enacted into a law.

THE closing of the furnaces on account of the coke strike is producing alarm among the rail and Bessemer mills west of the Allegheny mountains, and a great number will be compelled to seek relief in purchasing foreign pig iron.

Resources Held in Reserve.

The rapid advancement of California in population, wealth and improvements, must ultimately lead to a more extensive use of that large class of her natural products which have thus far been but little utilized or remain wholly neglected. As the cultivation of the land inaugurated a second epoch in the industrial history of the State, so will the business of developing these now neglected products constitute another such epoch when the time shall have arrived for its active prosecution. At first the leading, and almost only pursuit here, was mining, little or no attention having been paid to agriculture in any of its branches. Gradually it began to dawn upon our people that the soil and climate of California were adapted to the growth of wheat and the other cereals, also fruits of various kinds. Timidly they engaged in the business of grain-growing, vine and tree-planting, horticulture, etc. From that day to this their experience has been a series of revelations, each one disclosing some new productive capability for the soil and the climate. Fruits that it was thought could be raised only in intertropical countries grow and mature here with little care. Lands that were at one time considered worthless turn out to be exceedingly valuable, there being in this State no such thing as absolute sterility where water can be had for irrigation. Surveying the present status of agriculture, all are surprised at the changed conditions and view that the passing years have brought with them.

Even so will it be, we predict, when, some few years hence, these other resources, now so little heeded, shall come to be looked after and turned to practical account. Little by little we shall enter upon the task of seeking for and appropriating them to our use. Now it will be granite, marble and other descriptions of building stone; then cement, salt, asbestos and mica; next, perhaps, pitch, rosin and turpentine, arresting their importation from North Carolina. In good time, the now dead iron industry will be reencited and extended. No Californian can feel quite right till he sees again the fires aglow in the furnaces at Hotelling. The business of mining for coal, manganese, antimony, chromium and graphite, now struggling, some of them nearly extinct, will undergo more or less expansion. The output of petroleum, asphaltum, lead, copper, borax and quicksilver will be enlarged. By-and-by we will get to quarrying and dressing our fissile slates—make larger use of our infusorial earths, plastic clays and mineral paints; also of soda, manufacturing more and better soaps and yeast powders—make also soda of the caustic kind, the latter now obtained from England. As our soils become impoverished we shall have to use gypsum, which, fortunately, we have in great abundance. We have, in fact, nearly all of the above-named mineral products in great plenty, the most of them being also of good quality.

When we get to work in this new field, it will, we opine, astonish us by its richness; just as the land did by its unexpected capabilities. When that time comes it will bring with it such industrial activity as will further enhance property values and infuse additional life into business of every kind. With it will come an increased demand for labor, coupled with diminished importation of many articles and commodities now obtained abroad. Experimenting in the manufacture of the useful minerals and metals and these other crude products, improvement will come as it did from our trials in the province of agriculture. As we have succeeded in making an acceptable wine and a presentable raisin, so may we hope to succeed in finding a good cement and a superior marble, and so on through the entire list of these our resources held in reserve. These resources contain the elements of a wealth that must inevitably add largely to our already well-assured prosperity.

GRAVEL that will pay about \$4 a day for rocking has been found on a ravine which is a tributary of Steamboat creek, Washoe valley, Nev. Five or six Americans are at work in the diggings. Could sufficient water be had for eluicing, it is said the ground would pay \$8 or \$10 a day. The diggings were found by a couple of Mexicans.

ANY one in want of a metallurgist and assayer will do well to consult our advertising columns.

Neglected Gold-Bearing Lodes.

To us in California it seems a little strange that the people of England and other European countries will continue to mine for the ores of the precious metals in localities where these ores are of low grade, are generally base, and are costly of extraction, baving to be recovered from great depths, when they might embark their capital in the business on this coast under conditions so much more favorable. There are in this State literally thousands of gold-bearing quartz lodes that yield an ore from 200 to 300 per cent richer than the average worked in these older countries, the cost of extraction and reduction being but little greater here than it is there. Upon the most of these lodes little or no work has been done, for which and other reasons they can be bought at very small prices. The cost of one "going" mine would purchase a score of these unprospected or but little prospected lodes, a majority of which, with a moderate expenditure, would be pretty sure to develop into paying properties.

These lodes are not mines, but the most of them contain the elements to make mines of varying degrees of excellence, it being possible to determine their prospective, and even their positive values, without any great outlay of time or money. We have on various occasions called the attention of investors, both home and foreign, to this class of gold-bearing deposits as presenting an inviting field for new mining enterprises. What surprises us is they should seem so slow to appreciate its advantages. If money is going to be put into mines, this, it strikes us, is the direction in which it should go.

A New Feedwater Heater.

Paul Rossiter, chief engineer of one of the Pacific Mail Steamship Co.'s steamers, running between this city and Panama, has patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, a feedwater heater, which he has been using for some months successfully. The invention is a feedwater heater and drain-er from the jackets of steam cylinders. It consists of a connection and mechanism whereby the steam used for the jackets of steam cylinders, etc., to prevent condensation and variation of temperature of the cylinder and pistons, is carried directly into the main feed-pipe, and thence to the boiler, without itself passing into the hot well or condenser, as is usually the case. The cylinders of marine and other engines are usually surrounded by an exterior jacket into which live steam from the boilers is allowed to pass, and this heat serves to maintain an even temperature within the cylinders and piston, and prevents too great radiation and condensation within the cylinder. The water of condensation escaping from this jacket, passes into a receiver, through which it is usually carried to the hot well or condenser, from which it is pumped back into the boiler with other condensed water in the usual manner. This causes considerable loss of temperature during the passage, and also the heating up of the air-pump valves and other parts. Mr. Rossiter's new plan overcomes these objections. In his invention the water is taken directly from the receiver and delivered into the main feed-pipe so that it is carried directly into the boiler several degrees higher in temperature than could otherwise be accomplished.

THE MECHANICS' FAIR.—William T. Coleman and a majority of the other members of the "Committee of Twelve," have signified that they will accept the invitation of the managers of the Mechanics' Institute to co-operate with them in making this year's exhibition a greater success than any of its predecessors. As soon as possible a definite plan will be perfected whereby the best results may be attained.

THE Department of State has received information from the United States Consul-General at St. Petersburg that an agricultural exhibition, with competition in agricultural implements and machinery, will be held at Kharkoff, Russia, between the 2d and 22d of October, 1887. Americans can compete in the exhibit of horses, cattle, ewine, poultry and agricultural implements and machinery.

THE duties on the 10,000 tons of English steel rails to be delivered this summer at San Diego to the Atchison road will be about \$175,000.

Steam Coasting Schooners.

A new feature of late in the lumber trade of the coast is the use of auxiliary engines in the schooners which run between San Francisco and the mill ports. These vessels steam up the coast against the wind, and use both sails and steam to return, unless the fair wind is strong, when sails alone suffice. The trips are made regularly and quickly. The latest one of this class of vessels built is the Tillamook. She was constructed by Bolte & Breeden, and is 136 feet over all, 125 feet on the keel, 33 feet beam and 10 feet depth of hold. She has a registered tonnage of 210 tons, with an estimated carrying capacity of 350,000 feet of lumber. Her engines, constructed by Hinckley, Spiers & Hayes, of the Fulton Iron Works, are of 225-horse power. Pollard & Dodge, the lumber merchants, are the principal owners.

On Saturday last this new vessel was tried. She first went up the bay nearly to Hunters' Point, thence back along the city front and a short distance outside the heads; back through Raccoon straits as far as California City. At Sancelito the vessel stayed an hour or more. There were some 250 invited guests aboard, all of whom enjoyed themselves greatly.

The engines during the trip were in charge of Robert Christie, superintendent of the Fulton Iron Works. The machinery worked smoothly. The highest speed attained was 10 knots. The master was Capt. Robert Miner, who is part owner and will command the vessel. He was formerly captain of the schooner Vesta, and has been for some time engaged in the coasting trade. Linus Stewart, lately superintendent of machinery at Mure Island Navy Yard, and formerly a chief engineer in the Pacific Mail Steamship Company line, has been engaged as engineer of the vessel. The first business trip of the Tillamook will be to Fort Bragg, Mendocino county, to load with lumber for San Diego.

Plumas and Sierra Mines.

We had a conversation this week with B. W. Barnes, of La Porte, Plumas county, an old resident of that region. He states that, generally speaking, the mining interests of Plumas are rather better, as far as quartz and drift mines are concerned, though they have had to give up the idea of hydraulic mining altogether. Of course the mining industry is not what it was when the hydraulic mines could be worked. Last year around La Porte, the mines did better than before, and some new claims were opened.

The Bunker Hill, about eight miles above Gibsonville, but across the line, in Plumas county, is opening up splendidly and bids fair to be one of the finest mines in the State. The Dutch Hill country drift mine, up near Big Meadows, is also looking up.

In Sierra county the mines are doing well. The Lincoln Company, at Howland Flat, are doing first rate in their drift operations. The quartz interests of Sierra are increasing in importance. The Young America and other mines are paying handsomely and showing good clean-ups every month.

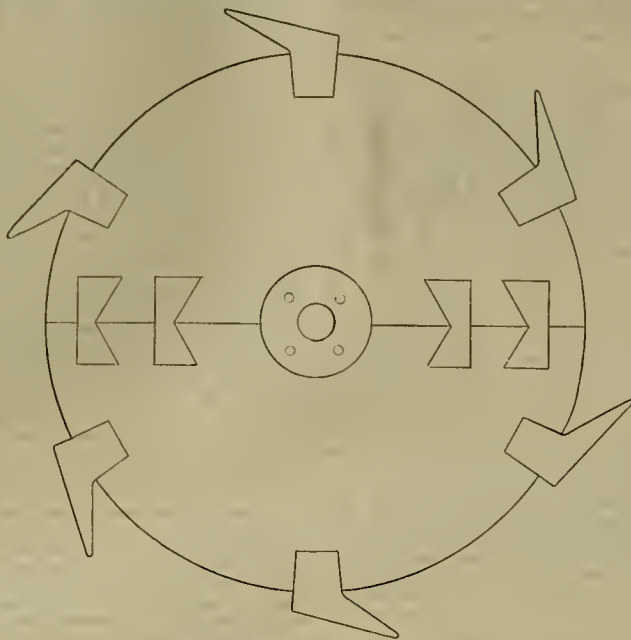
Mr. Barnes says that the Big Meadows, Plumas county, are becoming better known every year, and many people now go there in the summer. There are three good hotels in the meadows, and fine trout fishing. The scenery is fine and the summer climate unsurpassed.

THE STANFORD UNIVERSITY.—The cornerstone of the Leland Stanford, Jr., University was laid at Palo Alto last Saturday. No formal invitations were issued, and the whole affair was conducted in a very quiet, unostentatious way. Beside Senator and Mrs. Stanford, 18 of the trustees, and about a dozen other gentlemen specially interested, there were ladies, school children and neighbors present to the number of 300 or 400. The ceremonies were simple and impressive. Dr. Stebbins offered a prayer; Judge Lorenzo Sawyer, President of the Board of Trustees, made a fitting dedicatory address; and Senator Stanford himself deposited in the foundation a copper box of documents relating to the endowment and establishment of the institution, and with hammer and trowel laid the corner-stone in place above it.

At the request of the Japanese Government, Secretary Whitney has ordered the admission into the Naval Academy of H. Nic, aged 17, a Japanese youth of noble family.

A "Pioneer Saw."

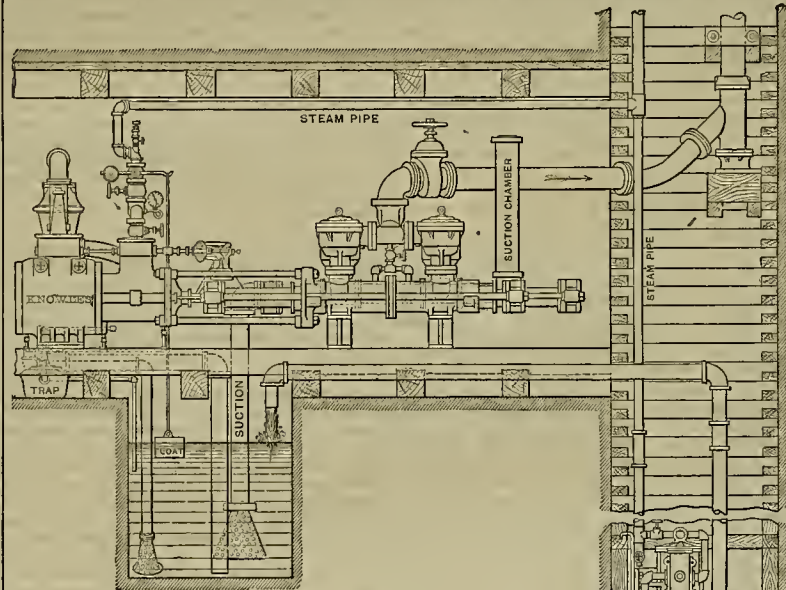
C. P. Sheffield, one of the proprietors of the Pacific Saw Manufacturing Co., came to this State in 1850, and during that year went to Sierra county to repair a saw for Col. Durgins and afterward run the mill for him. In 1851



FIRST SAW MADE IN CALIFORNIA.

he built a mill near Downville with Messrs. Craycroft and others, and run the mill when built. He came back to San Francisco in 1852 to get an engine and boiler for a sawmill, but found he could get no circular saw. Therefore

The accompanying engraving is from a drawing representing the 600-foot pump station of a mine, with the Knowles compound condensing duplex pumping engine in place, and the sinking pump in position below the station.



STATION PUMP FOR MINES.

he had to make one or go without. There was no iron here large enough. He obtained some boiler plates, cut them into proper shape and joined them together to make a circular plate. Then he formed the insertible teeth and put them in. We give a sketch of this saw on this page, it being the first ever made in this State. It was used in the mill until a better one could be procured from New York. The mill was above Sacramento at a place called Twenty-six Mile House. The small pieces shown in the drawing were set in flush and mated so as to join the two pieces of boiler plate together to form the circle. There were 12 inserted teeth.

It was not until 1864 that the first muley saw was made here, and Mr. Sheffield had to do with that also, at the old shop on Battery and Jackson streets. This muley saw was exhibited at the Mechanics' Institute Fair. Now the establishment of which Mr. Sheffield is part owner, turns out an immense number of saws and various kinds of sawmill machinery every year.

The competition of the Canadian Pacific road on tea, silk and sugar from the Orient to the Eastern seaboard points will be met by the National transportation lines, and is one of the leading subjects of discussion before the Chicago convention now in session.

A Station Sinking Pump.

The accompanying engraving is from a drawing representing the 600-foot pump station of a mine, with the Knowles compound condensing duplex pumping engine in place, and the sinking pump in position below the station.

usually carried to the snmp or into a special connection arranged on the suction nozzle of the sinking pump. This connection is a condensing arrangement (not shown in the cut), and which does away with all exhaust steam-pipes in the shaft.

With an arrangement similar to that described, mines can be sunk to any depth desired, or flooded mines recovered with the greatest facility and security. For mines of extreme depth it has been found advisable to put pumping stations at every 500 or 600 feet distant apart, although this distance has been as great as 800 to 1000 feet, when desired. By this system, the compound condensing pumping engine in the lower station delivers to the next above (which is a duplicate of same), and so on to the surface. Below the lowest pump station is placed the sinking pump, as referred to above. Generally these sinking pumps are duplicated for convenience and security.

Alfred Russel Wallace.

That very distinguished naturalist and traveler, Dr. Alfred Russel Wallace, Fellow of the Royal Society, is daily expected in California, and will lecture next week in Pioneer hall, in this city.

Dr. Wallace has devoted himself to naturalistic studies and researches since 1845. He spent four years on the Amazon and eight years on the Malay archipelago, making extensive zoological collections. It was while living in the East that, without knowing of Darwin's cognate researches and speculations, he wrote a theory of development by natural selection, though not using the latter term. He, therefore, really published the theory of evolution before Darwin. He has published many valuable scientific works. Among these are "Travels on the Amazon and Rio Negro," "Palm Trees of the Amazon," "The Malay Archipelago," "Contributions to the Theory of Natural Selection," "The Geographical Distribution of Animals" (which practically founded a new science), "Tropical Nature," etc.

Dr. Wallace will lecture on Tuesday, May 24th, on Darwinism in general, showing what it is, or rather, what it is not. On the 27th he will deliver another lecture, taking some one special aspect of Darwinism. The lectures will be illustrated by means of a stereopticon. This will be an opportunity for all lovers of science to hear one of the distinguished men of the age on a topic in which he is thoroughly at home.

Mining Accidents.

An employee of the Kennedy mine, Amador county, had his arm broken by the falling of a large smokestack which they were taking down at the old mill.

M. H. Penhale met with a serious accident in the Sierra Buttes mine last Monday, by a cave of rock which struck him on the hip. Dr. Tilly was called to give the man the necessary surgical attention, and it is thought he will be able to resume his regular occupation in a short time.

On Wednesday last an accident occurred at the Chollar mine which resulted in the death of David Bertrand, by falling down the Chollar shaft, a distance of 100 feet. He lived long enough to be brought to the surface, and expired shortly afterward. He was formerly night foreman at the Combination shaft.

The Nevada & California Railroad Company is rapidly pushing its road north of Reno, Nev. About eight miles of road have been graded and a large force of graders is now at work. The surveyors have finally located the route to Hot Springs, in Lassen county, and are now at work extending the road to Madeline plains.

The Enterprise says that there are still many idle men on the Comstock, even among old settlers. New-comers wish themselves away about as soon as they land. Some who have been waiting there for two or three months have not yet got a job. Others have struck out for the lumber camps in the Sierras.

The Bisbee steam wagon takes the loaded wagons from Bradshaw's station to the town, a distance of nine miles. It makes a round trip daily, and hauls five of Carr's large freight wagons easily. The wagon is fast gaining favor in the eyes of the mine-owners of Bisbee.

MECHANICAL PROGRESS.

Gun Steel and Armor Plates.

The European iron-workers are still wrestling with the problem of how to make impenetrable armor plates and how to construct guns and projectiles to defeat any such effort. The great probability of an early and general war that may involve all the leading powers of Europe gives unwonted interest to these rival efforts. Our own country, although far removed from the immediate scene of the prospective conflict, should not and cannot remain a disinterested spectator to the contest.

The tests a dozen years ago at Spezia showed that the live projectile went clear through French all-steel plates, and cracked compound armor plates. If the shell should not get into the ship alive a clear-cut plate might be less dangerous than a cracked plate, for quick plunging ought to stop much of the threatened mischief; but a live shell is not so easily dealt with after it has secured an entrance, and so Sheffield reasons. It is but a few weeks since it was semi-officially announced that the superiority of French iron and steel had become so apparent that the English Admiralty had ordered some armor plates from the Creusot Works. It is also said that the United States has decided to place the same orders for plates for the new cruisers recently ordered to be built—one of which is now in process of construction in this city.

Still later comes the word from Sheffield that Messrs. Cammell & Co. have produced still a new style of plate with greater resisting power than any hitherto turned out. It is constructed in accordance with a patent recently issued to a member of that firm. It is said that the face of the plate is specially hardened to withstand penetration, and in addition to the customary iron hatching, it is further strengthened by a third stroke of ingot iron. The plate is also still further subjected to peculiar treatment known only to the manufacturers.

It is claimed that the remarkable success which has attended the experimental trials with this plate has once more placed defense in the ascendant, and Sheffield, which has greater interest in defense than in attack, is jubilant.

The aim of the inventor has been not only to secure rigidity under attack, and to resist penetration by chilled projectiles, but also to resist steel shot. It is claimed that he has been successful at all points, and if this first experiment of the kind should be confirmed by others, then compound armor plates as made in Sheffield have further established their position. It will now be for steel plates to prove themselves equally efficient.

While all this has been going on, another Sheffield firm has been experimenting on shells with the view of completing a large Government order for such projectiles. This firm has devised a 6-inch shell which, fired at Shoeburyness under Government conditions against a 9-inch compound armor plate, passed through unbroken and afterward entered three feet of granite. A 9-inch French shell, fired on the same day, failed to penetrate a 12-inch compound plate. Sheffield contends that the trial in which their 6-inch shells were successful was severer than that applied to the 9-inch French shell.

So goes the friendly war of competition between attack and defense. Which will win in the end, time alone can tell.

A NEW ANTI-FRICTION BEARING.—What appears to be an excellent anti-friction bearing is one among a number of recent inventions worthy of note. It is designed for vertical shafts that revolve at a high rate of speed and are required to support considerable weight. Briefly, below a collar secured by set screws, the shaft passes through a pillow block and hox, and terminates in a step which consists essentially of a hollow casting, within which the shaft-guiding socket fits. The socket is so formed that there is an annular oil chamber about the socket, fed by proper oil ducts, and, about in line with the bottom of the shaft, there are two oil ducts, leading from the chamber to the interior of the socket. The step merely acts as a guide for the lower end of the shaft, and not as a weight-supporting device, the weight of the shaft and its load being taken up by a series of anti-friction balls that rest within a groove formed on the upper side of the pillow block, a corresponding groove being formed on the under side of the collar. The box to which the pillow block is bolted is provided with three or more converging slots, in which are adjustable blocks made of any of the well-known anti-friction bearing metals.

THE MYSTERIOUS BURSTING OF GUNS.—The well-known civil engineer, Colonel Maitland, has suggested a new theory to account for the frequent mysterious bursting of guns. In dealing with the effects of forging and annealing upon the particles of the metal by checking and controlling the molecular vibration of the mass, the colonel has suggested a theory to account for the mysterious bursting of guns by small charges after passing severe proof. A six-inch gun and a 12-inch gun were thus shattered at their first round after lying idle for nearly two years, and the suggestion was that during this time the particles tended to rearrange themselves in obedience to internal strains, and in so doing permitted the development of lines of in-

ferior cohesion, if not of positive cracks. Col. Maitland says that he attaches great importance to annealing, even though it may undo the hardening, and he questions whether it is worth the risk of setting up internal strains by oil-hardening at all, except, perhaps, in the case of the actual lining of the gun.

NEW SOLID DRAWN COPPER TUBES.—The patent process for making solid drawn copper tubes introduced by Heaton & Sons, of Birmingham, is said to have proved a pronounced success. We recently gave some particulars of this process, but it may perhaps be well to recapitulate that round bars or "billets" of metal are fixed firmly in a matrix and are then pierced to the required diameter by the mandril which revolves and is forcibly driven forward. This is done without taking any metal from the "billet," since the mandril as it forces its way through spins aside the covering. Elongation of the metal is a natural consequence, and at one thrust a billet two feet three inches in length becomes a shell tube four feet long. It is then ready for treatment at the ordinary draw benches to be finished into tubes of any requisite diameter. The English correspondent of the *American Manufacturer* says that the firm is now greatly enlarging its works to meet the orders which are being received much faster than it can execute them. As an evidence of the manner in which the invention is appreciated on the continent, the patent rights have already been sold for several of the European countries, and negotiations are at the present time going on with other countries. Numerous manufacturers have been over Messrs. Heaton's establishment to view the process in operation, and without exception have expressed their surprise at the marvelous results so simply obtained. It would appear that the invention is effecting a great change in the former method of producing these seamless copper tubes.

AN ALLEGED VALUABLE DISCOVERY.—A discovery of a somewhat startling economic improvement has just been reported in some of the English technical papers. It relates to the matter of fuel combustion and the heating of steam boilers, and is said to be under experimental demonstration in the county of Durham. By this process, it is claimed, the cubic hulk of fuel that will henceforth be required for marine steam engines will be reduced by 70 per cent, giving a gain to the extent indicated by that proportion to the stowage space for cargo in ocean-going steamships. The time for raising steam will be diminished in all steam boilers, stationary or marine, by at least two-thirds. The cost of fuel consumption will be reduced by one-half; and the production of smoke will be absolutely annihilated. All arrangements in connection with the invention will shortly be completed, when a full description of the process will probably be available.

METALLIC CEMENT.—The *Chemist and Druggist* (London) tells us that the cement which was used in the restoration of the colonnade of the Louvre, of the Pont Neuf, and of the Conservatoire des Arts et Metiers, consisted of a powder and a liquid, prepared according to the following formula: 1. Two parts by weight of oxide of zinc, two of crushed limestone of a hard nature, and one of crushed grit, the whole intimately mixed and ground. Other in suitable proportions is added as a coloring matter. 2. A saturated solution of zinc in commercial hydrochloric acid, to which is added a part, by weight, of hydrochlorate of ammonia equal to one-sixth that of the dissolved zinc. This liquid is diluted with two-thirds of its bulk of water. To use the cement, one pound of the powder is to be mixed with 2½ pints of the liquid. The cement hardens very quickly, and is very strong.

POLISHING THE INTERIOR OF METAL TUBES.—The operation of polishing the interior of metal tubes is now accomplished with far greater facility than heretofore, especially in the case of lengthy pieces, by means of a recently devised machine. This improved apparatus contains a revolving shaft carrying a polishing head or disk at one end, and used in connection with a clamp composed of a sleeve having a split end, and of a nut for clamping the split end of the sleeve on the tube to be polished. In practice, the emery head is revolved rapidly within the tube; while the latter is being gradually carried forward, the shaft and the tube are rotated in opposite directions; hot water is applied to the tube by a hose-nozzle which is being carried forward with the tube, the whole arrangement being thus simple and effective.

STEEL VS. IRON.—As an evidence of the rapid manner in which mild steel is supplanting puddled iron for general use, it may be remarked that the production of puddled bar in England has largely and steadily declined during the last five years. In 1882 the production was 2,841,534 tons, and in 1886 it was only 1,616,701 tons, which is a decrease of nearly one-half. In the same interval the production of Bessemer and open-hearth steel increased 155,000 tons. The decrease of 1,224,833 tons in the production of puddled bar in this half decade named being compensated for only to the extent of an increase of 155,000 tons in the production of Bessemer and open-hearth steel, shows a serious decline in the production of the rolling-mills of England.

SCIENTIFIC PROGRESS.

THE DEPTH OF EARTHQUAKE DISTURBANCES.—In a communication to the National Academy of Sciences, Captain C. E. Dutton gives a calculation of the depth of the Charleston earthquake at the center of the surface disturbances, which puts it at the distance of 12 miles below the earth's surface. The calculation by Robert Mallet of the depth at which the Neapolitan earthquake of 1857 originated was the first attempt to solve such a problem. Working on the assumption that the earth wave radiates in straight lines from the origin, and hence at different distances from the center of surface disturbance it has different angles of emergence, Mallet found that lines drawn parallel to these angles, if projected, would intersect each other at a mean depth of about five miles under the surface. From seismometric and other indications the mean depth of the Yokohama earthquake of 1880 was calculated to have been about 3½ miles. While much greater depths of center have been assigned to some earthquakes, the accuracy of the calculations has been doubtful. Captain Dutton's new method of determining the depth of the focal cavity at Charleston gives, therefore, a most remarkable result. But his conclusion is in harmony with the observation of Mallet, that "earthquakes which have a very great area of sensible disturbance have also a very deep seismic focus."

A RED-HOT TELEPHONE TRANSMITTER.—Experiments have recently been made in England with a red-hot wire as a telephone transmitter. An account of these has been communicated to the Royal Society, Prof. G. Forbes and Mr. John Munro. A fine platinum wire, several inches long, was included in the circuit of a charge accumulator, and this primary wire of an induction coil. A receiving telephone was connected in circuit with the secondary wire of the induction coil. The battery power was such that the fine wire in the primary circuit was heated to a high temperature and rendered incandescent. When in this condition, on speaking to it the words could be heard in the receiving telephone. The explanation of the phenomenon is, that the sound waves passing the incandescent wire in quick succession altered its resistance by cooling, and thus varied the strength of current in the primary circuit. The fluctuations of current thus caused excited corresponding fluctuations in the secondary circuit, and these reproduced the voice in the receiver. Spiral wires in the form of watch-springs, of steel and platinum iridium, were tried in place of the straight wire with some success. An india-rubber diaphragm was also interposed between the voice and the heated wire, and found to influence the wire like the direct voice. Mechanical vibration did not affect the apparatus.

TRACING OCEAN STORMS.—The International Marine Signal Service, recently established in this city, is becoming very important to sailors. Captains of vessels about to sail from European ports for America can learn with tolerable certainty whether they will encounter unusual storms on the voyage or not, and if so, where they may expect to encounter them. Signal-service midnight reports are telegraphed across the ocean from Washington every 24 hours. The system of gathering data is as follows: The captains of vessels are required to make certain meteorological observations at stated periods during the passage, and, upon landing here, deliver them to the marine signal station. These observations are relative to the variations of the barometer, the temperature and the velocity and direction of the wind. This information is then sent to Washington, whence it is transmitted to European ports. Thus, if a severe storm is encountered on this side of longitude 45° west, the captain reports its velocity on landing, and his data reach Europe in time to notify sailing masters on the other side where they will meet it. In this way each steamer becomes a floating signal-service station.—*N. Y. paper.*

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—The thirty-sixth annual meeting of the American Association is to be held in New York, during the week beginning August 10th. The Academy of Sciences has among the local societies taken the lead in the matter of arranging for the reception of the national body, by appointing a committee of conference to secure concerted action among the different institutions of the city. Committees on ways and means, and other permanent organizations, it is hoped, may be early brought about, as the time is none too long at the best. The meeting last year, at Buffalo, was not a very large one, and offered a contrast to the great Philadelphia meeting of 1885. It is to be hoped that the metropolis will serve as an attraction, and secure the presence, not only of representative American scientists, but of European ones as well.

A FIELD FOR WORK UNDER THE SEA.—A writer in one of our contemporaries suggests the development of submarine navigation as one of the works of the future. He contrasts the amount of time and thought which has been expended upon the solution of the problem of flight with the little that has been done in the other field. Men have ever shown themselves more anxious to rival the birds than to cope with the element of the fishes. Yet under the

waters all is peace, where on the surface the floating ship is exposed to the maximum wave action of the unstable elements. The character of instability disappears from the ocean at a small depth, and 30 or 40 feet down it is the type of constancy of conditions. The prediction is formally made by the writer in question that in the future this mode of journeying will be extensively indulged in. Then Jules Verne's work will read like a prophecy, and 20,000 leagues, and many times that, will annually be sailed under the sea. Such are substantially the conclusions of our writer. Whether they will be verified or not must he left, we fear, to future generations to see.

THE BOTANIC GARDENS OF THE WORLD.—According to a report of the Montreal Horticultural Society, there are 197 botanical gardens in the entire world, and they are thus distributed: France and her colonies, 25; England and Ireland, 12; the English colonies, 27; Germany, 34; Italy, 23; Russia and Siberia, 17; Austria and Hungary, 13; Scandinavia, 7; Belgium and Holland and colonies, Spain and colonies, and the United States, 5 each; Portugal and Switzerland, 3 each; Denmark and Roumania, 2 each; Brazil, Chili, Ecuador, Egypt, Greece, Guatemala, Japan, Peru and Servia, 1 each. The list may be completed by mentioning the gardens of Geneva and Louvain, and a few that have recently been organized in English India. At least half of the gardens mentioned above are kept up by the Government, 18 per cent by universities, sometimes in conjunction with the general or city Government, 11 per cent by cities alone, and 5 per cent by private donations. Out of the same number 94 per cent are always open to the public, 70 per cent are open to visitors on Sunday only, and 73 per cent publish reports or contribute in some such way to scientific research.

TURKEY RED FROM CASTOR BEANS.—A. Braunstein has taken a German patent for the direct production of Turkey red oil from oleaginous seeds, as follows: The oil seeds, castor beans preferably, are first freed from their shells by passing them through horizontal rollers, then washed, and treated with strong sulphuric acid of at least 66° Be. The acid may be mixed with the seeds, and the mass ground up together; or the seeds are ground to a fine meal and treated with the acid in a suitable vessel with a stirrer, and which can be kept cool. After 40 to 60 per cent acid has been gradually added and stirred together with the meal, the mass is allowed to rest for several hours, when the sulphated oil, which has separated out at the top, is drawn off. The sediment is then washed out with two waters, to extract from it the remaining oil, and the washing waters being added to the first product, the whole is again allowed to stand for several hours, when some common salt is added to completely separate the sulphated oil, which is then neutralized with ammonia or caustic soda in the ordinary manner.

TRANSPARENCY OF MOLTEN IRON.—According to *Engineering*, it has been observed that the molten iron seen during a casting of several tons is transparent. It was possible to see hodies through the stream of metal, they taking, however, a yellow tinge. The observation is one of much interest, and perhaps others engaged in the iron industry will be able to confirm it, since it is hardly likely that the phenomenon has not been witnessed before. In noticing the above, a correspondent of the *Iron Age* remarks as follows: "My experience has been that iron of certain grades will, when flowing over the dam in the runner below the skimmer (as practiced in running iron at blast furnaces), be frequently so transparent that the sand over which the metal is passing will be distinctly visible, though of a yellow tint. The writer has observed this not infrequently for the past 10 or 15 years, and has called the attention of others to it. All grades of iron are not transparent in flowing."

LIGHTNING AND WHERE IT IS MOST LIKELY TO STRIKE.—Dr. Hellmann, of Germany, has recently discussed the probabilities of lightning. He finds no basis for the conclusion that lightning strokes are increasing, in that country at least. The striking of any particular building depends upon its height, material, comparative isolation, and the soil upon which it stands. His investigations lead him to the conclusion that for every stroke upon limestone ground we may expect seven on clay soil, nine on sand and twenty-two on a loam. In open plains the danger is greater than in the city. In the kind of trees selected, it appears that an oak is struck 54 times against the beech once.

FREEZING MIXTURE.—A liquid invented by Raoul Pictet, of Geneva, Switzerland, for use as a disinfectant, answers well as a freezing mixture for hardening microscope specimens. Sulphur dioxide and carbon dioxide, having been mixed and cooled, are compressed until they are liquid, and stored in siphons. When liberated, they rapidly evaporate with great reduction of temperature. By this means mercury may be frozen and animal or vegetable tissues rendered solid in a few seconds. It is as easily managed and more effective than ether, the odor being the principal objection.

GUM BAGS which have become stiff and hard from use may be rendered pliable by immersion for a limited time in coal oil.

ENGINEERING NOTES.

A CABLE ROAD IN CHINA.—At Hong Kong a cable road has been constructed from the town to the peak, a range of very steep hills, on which are fine villa residences, and where the climate is more salubrious than near the harbor. The incline on which the road operates is 4800 feet long, and the line, which is partly single and partly double, is laid with 35-pound steel rails on steel sleepers. The gradients vary between 1 in 2 and 1 in 10, closely following the natural contour of the ground. The total height to which the cars have to be raised is 1300 feet, and the ropes, of which one is the working rope and the other the safety rope, run on separate sets of friction rollers. The cars are attached to each end of the ropes, and as one pair of cars ascends the incline the other pair descends. Each car is to contain 60 passengers, the maximum load being 7½ tons at each end of the ropes. The working rope is passed over a pair of drums eight feet in diameter, and the safety rope over one drum, the drums being fixed at the top of the incline and driven by two compound steam engines, 40 nominal horse-power each. The speed of the cars is to be six miles an hour.

CHEAPENING RAILROAD TRANSPORTATION.—One of the means by which railroad transportation has been cheapened is by greatly increasing the amount of load drawn. Two and even three times the amount of freight that used to be put on the cars can now be drawn. But this is, of course, accompanied by proportionate increase in both strength and weight of engines. Now the question that sorely puzzles many railway managers is, whether bridges built years ago will bear the additional strain now put upon them. Some of the largest and best engines on certain roads are put aside, because too heavy for the bridges over which they must run if put in service. An enormous outlay is now required on nearly all railroads in rebuilding and strengthening bridges to adapt them to the present requirements of railroad traffic.

THE AFRICAN INLAND SEA AND DESERT RECLAMATION.—According to the *London Times*, southern Tunis is being transformed by Captain Lendais, who is continuing the scheme of the late Captain Roudaire for an inland sea. The artesian wells now being sunk by him yield a large quantity of water, which is utilized in agriculture by the natives who collect around these new oases. Gardens are being created where, till recently, there was nothing but sand; and avenues of trees are growing which will one day be bordered by houses. In a few years, if the operations are continued, the whole region will have been converted from a desert into a garden. Artesian wells, without any change of climate, which it was at first suggested, should be brought about by converting a portion of the desert into an inland sea.

DISAPPEARANCE OF THE NARROW GAUGE.—The supplanting of the narrow by the standard-gauge width of railroad tracks goes on quietly but steadily. Attention is called by the *New Orleans Times-Democrat* to the gradual extinction of the narrow-gauge system at the South, where at one time it was preferred to the broad gauge. Narrow-gauge roads of Texas were left without an outlet last year by the change on the Panhandle line. The Houston East & West railway, running from Houston to Shreveport, will be converted at once into a standard gauge line. It seems only the question of a short time, says the above-named paper, when the narrow-gauge railroad will have disappeared.

LATEST NOVELTY IN RAILROAD EQUIPMENT.—The latest novelty in railroad equipment is the abandonment of the monitor top the standard adoption of a round-roof passenger car. The arch, of course, is vastly stronger than the broken line formed by the monitor, and is practically as strong as the sides of the car. The Boston & Albany has been running them for some time, and now the Bradley Car Works, Worcester, are building 20 round-roof cars for the Boston & Lowell road, and five suburban and four passenger cars for the Chicago & Eastern Illinois road.

THE TEHUANTEPEC SHIP RAILWAY.—It was feared that the Tehuantepec ship railway would suffer irretrievably by the death of its illustrious projector, Captain Eade. It is, therefore, gratifying, says an Eastern exchange, to know that Messrs. Andrews and Corbitt, who were assistants to the famous engineer in his lifetime, will now be able to carry forward the work of uniting the two oceans by rail. The interest in this isthmian highway is keen in America, and Congress alone is responsible for the delay in the consummation of the task.

PETROLEUM FOR EGYPTIAN LOCOMOTIVES.—Experiments have recently been made in Egypt on the line of railroad between Cairo and Alexandria, in using petroleum as a fuel for firing locomotives, it is claimed with success.

It has been demonstrated that the finer a screw propeller is in pitch, and the greater its speed of revolution, the more efficient it is likely to be. Important practical illustrations are available to support this argument.

USEFUL INFORMATION.

Colors From Coal Tar.

Prof. Watson Smith, of Owens College, Manchester, England, in speaking of colors obtained from coal tar, recently said: Formerly they used to rely principally upon vegetable dyes of animal origin. The vegetable or wood dyes, however, had to a large extent disappeared, and there were not many of these with which they needed to trouble their minds, because they had been replaced, and would be still further replaced, by other materials. There were really only two of these vegetable dyes remaining—indigo and logwood—all other wood dyes having been already more or less replaced by coal-tar dyes. Lac dye had been entirely displaced and the consumption of cochineal had been reduced to probably less than 200 tons per year. A great deal has been said against coal-tar dyes. They were told that these dyes were fugitive and poisonous, and that there could not be produced from them as fine a shade as was obtained from the vegetable dyes. Now all this was fallacious. It all that had been said against coal-tar colors was true, one would naturally be led to suppose that the consumption of them would decrease. But what was the fact? Why, in the last year the consumption of these coal-tar colors had increased more than 33 per cent. Trade last year was bad all over the world—they hoped that this year it might be better—yet this increase of consumption had taken place quite exclusively, he should say, in compound colors. No fabrics were now dyed in any of the pure colors, and the increase of consumption had taken place in judiciously blending these colors with themselves, or with vegetable dyes. A card of "spring shades, 1887," gives 150 different colors obtained from coal tar, without indigo or any vegetable dyes. These colors comprise many bright and most delicate shades. The amount of coloring matter derived from a ton of coal is very large; while the dyeing power of the coloring matters derived will astonish any thoughtful mind, for the magenta will dye 500 yards of flannel, the aurine, 120 yards, the vermilline scarlet, 2560 yards, and the alizarine 255 yards (Turkey-red cotton cloth). It should be borne in mind that all this coloring matter is derived from what was formerly the mere waste and worthless refuse derived from the coal in the process of the manufacture of gas.

A NEW MODE OF PRESERVING WOOD.—The *Technologist*, says the *American Architect*, describes a simple method of treating wood with preservative solutions, which is applied in Norway to telegraph poles. After the poles are set in place, a man goes from one to another with an auger, with which he bores a hole in each post, beginning at a point about two feet above the ground, and boring obliquely downward at as small an angle as possible with the axis of the post, until the point of the auger reaches the center of the stick. The auger-hole should be an inch in diameter, and, in telegraph poles of the ordinary size, will hold easily four or five ounces of sulphate of copper, which is put into it in the form of coarsely powdered crystals, and the opening then stopped with a plug, the end of which is left projecting as a handle, so that it can be pulled out and replaced. Just what action it may have then goes on in the interior of the stick, no one pretends to say; but it is found that the crystals of copper sulphate disappear slowly, so that every three or four months the charge must be renewed; while the wood, both above and below the auger-hole, even to the very top of the pole, gradually assumes the greenish tint due to the presence of copper in the pores.

THE SOURCE OF MANNA.—Sicily is the chief source of manna. In that country the trees are cultivated in plantations, and when about eight years old they begin to yield. Out an inch and two inches long are made in the bark, cutting through to the wood. One cut is made daily, beginning near the bottom of the trunk, with each succeeding cut about an inch above the former one. The thick, syrup-like juice exudes from the cuts and hardens on the bark into white, spongy flakes, which, when hard enough, are removed and dried still further before they are packed for commerce. If consumed mainly of a form of sugar called manite and has mild laxative properties.—*Ex.*

THE JAPANESE are rapidly becoming the Yankee race of the Indies. They have already railways connecting Yokohama with Tokio, and another from Kobe to Osaka and Kioto, both routes of the first importance to travelers. These lines will be extended to all parts of the country; but the work of construction is not pushed with vigor. In telegraphs, too, Japan is making good progress. She has two lines connecting with Europe, one passing by Hong Kong and India, the other by China and Siberia. There is now a question of establishing another line, passing by the Hawaiian islands and America.

AN ANESTHETIC BULLET.—The *Court Journal* (London) states that a German chemist has invented a new kind of anesthetic bullet which he urges will, if brought into general use, greatly diminish the horrors of war. The bullet is of a brittle substance, breaking directly when it comes in contact with the object at which it

is aimed. It contains a powerful anesthetic, producing instantaneous and complete insensibility, lasting for at least 12 hours, which, except that the action of the heart continues, is not to be distinguished from death. While in this condition the bodies may be packed in an ambulance and carried off to hospitals or as prisoners. War, it is claimed, by this humane invention, will be reduced to a mere pastime, and the nations may indeed beat their swords into plowshares and their spears into pruning-hooks.

AMERICAN MACHINERY FOR EXPORT.—The inquiries for American machinery for export are of such number and character as to point to the probability of a great increase in demand for our machine-shop products. Ten or 12 cities are now working on contracts for improved machines, among which are Jersey City, Providence, Boston, Chicago, Pittsburgh, and Rochester, N. Y. A tool company in the latter place has just shipped an engine to Japan and one to South America.

A GRAYISH BLACK COLORING ON COPPER, according to the *Illustrirte Zeitung*, may be obtained by placing the object for treatment, after being well cleaned, in a weak solution of liver of sulphur. When a caustic effect has, after a short time, been produced, the object is rinsed, slightly beated and brushed with a stiff brush. This coating is said to be very durable.

The following is a list of the heaviest hammers in Europe from a historical point of view: Fr. Krupp, Essen, 1867, 40 tons; Terni Works, Italy, 1873, 50 tons; Alexandrowski, Russia, 1874, 50 tons; Creusot, France, 1877, 80 tons; Cockorill, Belgium, 1885, 100 tons; Fr. Krupp, Essen, 1886, 150 tons. The latter is now the heaviest hammer in the world.

AN ARTIFICIAL IVORY of creamy whiteness and great hardness is made from good potatoes washed in diluted sulphuric acid, then boiled in the same solution until they become solid and dense. They are then washed free from the acid and slowly dried. This ivory can be dyed and turned and made useful in many ways.

THE TENACITY of various metals may be correctly estimated by the resistance which wires of the same diameter experience when passed at equal temperatures through the same hole of a draw-bech. Taking steel at 100, iron has 88, brass 77, gold 0.750 fine 73, copper 68, silver 0.750 fine 54, zinc 34, tin 11, lead 4.

GOOD HEALTH.

Treatment of Biliousness.

The symptoms of biliousness are unhappily but too well known. They differ in different individuals to some extent, however. A bilious man is seldom a breakfast-eater. Too frequently, alas! he has an excellent appetite for liquids, but none for solids, of a morning. His tongue will hardly bear inspection at any time; if it is not white and furred, it is rough at all events. The digestive system is wholly out of order; diarrhea, or constipation, may be a symptom, or the two may alternate. There are very often hemorrhoids, or loss of blood even.

There may be giddiness, and often headache, and acidity or flatulence, and tenderness at the pit of the stomach. The pain felt in the right shoulder would indicate an extra bad case, but apart from this there are aching pains and even stiffness in the limbs, with more or less of orpime in the limb muscles, or burning in the palms of the hands, with hot, perspiring feet.

There may be drowsiness or torpor by day and sleeplessness at night, and all sorts and conditions of minds, especially irritability; fits of bad temper that come on suddenly and go off again, and that none are so thoroughly grieved at as the poor patient himself.

Bilious people generally fly for relief to aperient pills, and there is no doubt that they often afford temporary relief by relieving the over-gorged liver. This really is antiphlogistic treatment, but it assuredly is not radical. When a fish-pond overflows its banks, we may let off a portion of the water; but after this we ought, methinks, to find our way to the other end of the pool and lessen the inflow.

Well, just a word about treatment: First and foremost, then, in sudden bilious attacks, that are often accompanied by great prostration and by urgent vomiting, it is best to send for a medical man. Such attacks generally come on in the morning, at the time the body is most weak. I do not think upon the whole I should be justified in suggesting medicinal remedies in this paper, for the simple reason that cases differ so.

Little good will accrue from treating a case like this, however, if, when he is once more well, the patient returns to his old non-hygienic habits of life.

"What am I to do, then?" may he asked. I will tell you what you are *not* to do. You are not to overeat; you are not to use sugar or fat to any extent, puddings, pastry or cheese. You are not to touch alcohol. You are not to sit in overheated rooms. You are neither to overwork nor overworry yourself, and you are not to shirk the morning sun nor plenty of exercise.

What are you to do for the acidity? Abstemi-

ousness and regulation of diet and habits will entirely banish it, and you will have the pleasure of knowing that its absence is a sign of rejuvenating of the liver.

If you but try a week of the treatment I suggest, I feel convinced you will once more feel a pleasure in life and an interest in all your surroundings. I shall be quite satisfied with my present paper if it put a few of my readers on the right road to health, and that can only be got at by seeking for and removing first causes instead of treating symptoms.—*Cassell's Magazine.*

A Health Talk in the Nursery.

Health, and temperance, which in its broadest sense is the law of health, used to be taught from the cradle.

When my little four-year-old boy discovered the veins in my hands, I was obliged to lay down my pen and give a plausible answer before his childish curiosity would be satisfied. On being told they were little rivers carrying blood, an exploration of his own chubby hands followed, with the delightful discovery that he, too, had these "little rivers." Of course a volley of questions were fired at me in quick succession, the first of which was: "What is blood made of?" "What we eat." "What do the little rivers carry when I eat to my hands for?" "To make them grow." "Does everything we eat make our heads grow?" In that way he soon learned that some kinds of food furnish better building material for his bodily house than other kinds, and afterward, when inclined to eat something that was not suited to his child's stomach, I had no difficulty in inducing him to deny himself, when reminded of the work of the "little rivers." He does not want tea and coffee, because in our talks he has learned that they hurry the nerve-builders; but is a staunch friend of milk and brown bread, and takes great interest in his food, and by this means is learning to have power over his appetite, and exercise self-control. On discovering a picture of a man drinking beer, his first question was: "Does beer make my house grow?" On being told that the alcohol of the beer drank up the water in the "little rivers," and injured them, he voluntarily pledged himself against intoxicants, because he is inspired with an ambition to possess a fine bodily tenement.

His delight is unbounded if, when taking a bath, he discovers in some part of his body a vein heretofore unknown to him. I consider that here is foundation for a desire to make his body a splendid creature, with every nerve steady and every muscle trained to do his bidding. His imagination makes the wonderful little builders very real, and he will not intentionally retard their progress. He is willing to retire early because his house is being built more rapidly while sleeping and the very best work is done the first half of the night. We have even gone a step higher in our little talk, and learned to reverence the Creator of such a wonderful building, and that it is a sin to abuse a house so costly and beautiful, because it is God's workmanship. And all this came about without "cramming" his mind. The questions naturally came, at intervals, even after I had forgotten our previous talk, and it was better to give the little philosopher a reasonable, satisfying answer. He is a child of only ordinary intellect, so I believe every fact and law of physical life can be taught the child very early, and physiology become a fairy tale to the imaginative child, and they are all such. Every woman, for this reason, if for no other, should at once enlist in the department of hygiene. You owe it not only to yourself and community, but most surely to your children, whose first years are spent entirely with you, and at a time, too, when lasting impressions are made; the early impressions enter into the solid masonry upon which manhood is built. Some one has likened the knowledge acquired in maturity to paint and whitewash.—*Ex.*

A VALUABLE SURGICAL DISCOVERY, it is claimed, has been made by Dr. Chaigneau, of a new method which he has introduced for the treatment of scalp wounds. The account is given as follows in a medical journal. The locality we presume to be New York City: Assistant Police Surgeon Chaigneau is elated over a novel and valuable discovery which he has made in surgery. It is a new method of treating scalp wounds, and is as simple as it is effective. When a person suffering from a scalp wound applies at the Receiving hospital for treatment, Dr. Chaigneau does not shave the patient's head, nor stitch and bandage the wound. He merely gathers a small tuft of hair on either side of the wound and draws each in opposite directions and across each other, forming an angle directly over the mouth of the wound. The lips of the wound are thereby drawn as close together as if they were stitched. The next step is to tie the tufts of hair with a silk thread around the angle formed by the juncture. These knots of hair are made at intervals as far apart as the ordinary stitches in a wound. The tufts are kept in position until the wound heals, and while this process is going on, any pus that may form can escape. This discovery is of value, for the reason that the stitching of a scalp wound is objectionable, in that it is likely to irritate the flesh. The fact that it does not necessitate the shaving of the head enhances the value of the discovery, because the wound or scar can be concealed.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alameda.

STRUCK CHROME.—Livermore Herald, May 12: About two months ago, Peter Classen, the veteran chrome hauler, suggested to H. H. Pitcher that he thought he could strike a chrome ledge on the old Ab Mendonball claim. Mr. Pitcher remarked, "All right; if you find a 100-ton ledge, I'll give you \$100 and pay you \$3.50 a ton for hauling." Classen accepted the offer and went away, and Mr. Pitcher thought no more of the matter. Some two weeks ago, however, Classen started out with Wm. Keenon and John P. Olsen as assistants. They started in just west of the old workings, from which so much chrome was taken, and ran in a tunnel. Last week they struck a ledge which is opening out in good shape. We are informed that it is one of the best looking faces yet struck in the district. They came down on Sunday, but they are now back again, pegging away taking out chrome. The quality is excellent.

Amador.

SUTTER CREEK.—Cor. Amador Dispatch, May 13: J. H. Tibbits, superintendent of the Iowa M. Co., says that his mine has never looked as well as it does at present. He has a full force of men at work, who are running their mill night and day. Operations at the Wildman have quit, and it will be some time before they commence again. G. W. Horn has some 25 men at work on the Mahoney, and is still running 40 stamps. Operations are confined entirely to the surface. Last Sunday was cleanup day, and knowing ones say it has been the best cleanup made under this management. Sutter creek, one of the loveliest spots in this county, which has been so dull of late years, has at last taken a fresh start in the way of prosperity. Some of the old mines which have lain idle so long are on the verge of starting up again—one in particular, the North Star, which is going to be opened up before long, and operated principally by Sutter creek capital. They intend putting up machinery and sinking a shaft 1000 feet.

BIG TUNNEL.—Ledger, May 14: The men operating at the big tunnel at Middle Bar were discharged last Monday, and as far as that enterprise is concerned, matters are at a standstill. There were from 15 to 20 men at work. Nothing is now being done, unless it is a man or two working in the upraise on the lookout for pockets. A number of rumors are afloat concerning the speedy resumption of work. The cause of the suspension of active operations is no doubt the misunderstanding existing among the stockholders, and work on any scale of magnitude is not likely to be resumed until the differences are settled. Affairs at the Moore mine, which is, in a great measure, involved in the complications affecting the Middle Bar tunnel, being owned by the same parties, are moving along at a very slow gait.

NEW LONDON.—This property continues to develop fairly. An idea has got abroad, founded merely upon the fact of such exceedingly rich ore, showing such large quantities of free gold, being taken from it, that it is merely a pocket-ledge. There is nothing to justify such a conclusion. Similar rich discoveries have been made in every prominent mine in the county, with perhaps the single exception of the Zeile, where the rock is remarkably even in grade. At the Pacific, adjoining the New London, immensely rich quartz has been taken out, also at the Keystone, South Spring Hill, Gover, and Bunker Hill. The ore of the New London, as far as explored, gives every indication that the ledge throughout will come up to the paying standard, and probably exceed the average yield of the mother lode. The main shaft will be run about 100 feet deeper, when the opening up of levels will be entered upon. They are also sinking a new shaft about 300 feet north of the main shaft. This is mainly for ventilating purposes, and is smaller than the working shaft. We understand it will be put down 300 feet, at which depth it will be connected by drift with the main shaft.

Calaveras.

MURPHYS.—Cor. Calaveras Prospect, May 13: Within two miles of town, near Williams' ranch, is a very favorable field for the prospector. Pockets are frequently found and very rich lodes are numerous with more or less excellence. The Lillie mine in that district, owned by Lillie, Coleman & Morehead, is a mine of considerable promise; the shaft has reached a depth of 67 feet. The vein is well defined, and free-milling quartz is now being hauled to a custom-mill for reduction. Recently an engine was erected on the mine for hoisting and pumping. In proximity to the Lillie is the Mammoth, a large lode averaging eight feet in width, owned by Mr. Dodson. Some quartz was milled from the mine a short time ago that panned out liberally. Another large vein near by is owned by Geo. Taylor. The Silver Rufe gives evidence of permanency and prospects well. The Oro Plata Co. paid off on the 28th ult. Everything is about the mine in its first-class order, and the mill continuously running on quartz of fair quality. Three Burleigh drills are now at work stopping. The ore body is large and well defined. McCormick & Co.'s gravel claim on Central hill is giving a good account of itself, and slickens will, a century hence, add its mite to cover up the catfish in Mormon slough.

GOLD.—Calaveras Chronicle, May 14: The Central Hill gravel claim, owned by McCormack, Bissbee & Thomas, located at Murphys, this county, is turning out a large amount of gold. One pan of gravel taken from the bedrock yielded \$108.

Fresno.

HILDRETH NEWS.—Fine Gold Miner, May 13: Considerable ground was broken during the week in the shaft of the Hildreth mine; the ledge is two feet between walls; the quartz is of very good milling quality; the superintendent started the mill last Friday; about 475 tons of ore lies on the dump; the blankets of the concentrators show about three per cent of good sulphurets; through the center of the ledge every few feet is found pockets of decomposed quartz that are very rich, and scarcely a day goes by that specimens are not found, which are shipped to San Francisco by express to Wm. Dunphy. Prospects are looking bright at the James and Francis mine. During the last week the develop-

ment of ledge and ledge-matter has increased considerably, and, as indications now show, the property would undoubtedly justify the owners in erecting a 10-stamp mill. The shaft is 265 feet deep, with 100-foot levels east and west, all of which are in ore. The six levels of the McNally mine are being driven ahead in good ore. The ledge will average 2½ feet between walls, and carries considerable talc, which works through their 10-stamp mill very easily. They are crushing 20 tons daily. Mike Walsh is sinking in good ore in the Black Hawk. Prospects in the vicinity of the Mountain View have been changing hands recently, and this is looked upon as an indication of confidence in the section. It is rumored that John M. Wilson has bought the Zebra mine, which means that J. B. Haggin and George Hearst will own the controlling interest. Applegarth has gone to Fresno to conclude the sale of the Morning Star mine, and we understand that his partner, Mr. Parker, will add two of Redstone's mills to the one that is now upon the property. Mr. Robinson, of Fresno City, lately refused to take \$15,000 for a half-interest. This mine joins the Rough and Ready prospect that is being worked by the Baker Bros. Joe Seaton visited Hildreth last week, and reported that mining is looking up at Old Fresno Crossing. The district is alive with prospectors locating claims, while some are doing good work upon ledges that mill \$25 per ton coarse gold. The ledges in this vicinity carry less sulphurets than those around Fine Gold or Hildreth, but the difference in silver is very great. The company that owns the Spangle gold mine has decided to build a 10-stamp mill, which will be running by the 1st of August. The ore by mill test works about \$40 per ton. Considerable work is going on at the Wilson mine. The superintendent is working a force of miners in the shaft night and day. The ledge is over two feet wide, and has been for the last 40 feet. The ore is similar to that on the dump, part of which has been worked through Smith's arastra, netting \$65 in coarse and fine gold per ton. Lee & Byrnes have struck some very rich rock in their Table Mountain prospect. T. W. Robinson reports that the Big Bonanza has developed 2½ feet of ore that will, without assorting, pay to run through his arastra. The Hildreth mill is doing good work, crushing 12 tons every 24 hours, and showing good results upon the plates. Night and day shifts have been put on at the Black Hawk, and the owners will push the work in attaining depth as rapidly as possible.

Mono.

THE BULWER CON.—Bodie Miner, May 16: Upraise No. 1, 200-foot level, has been advanced 14 feet, showing the ledge four feet wide. North drift, 150-foot level, has been extended 11 feet; the vein at this point is two feet wide.

THE BODIE.—The east crosscut, 900-foot level, was driven 25 feet, with no change to report in the character of the rock cut through. The south drift was advanced 13 feet, showing about one foot of broken vein. The work of cleaning out the 100-foot level is about finished, and during the coming week we will start drifting to the south.

CON. PACIFIC.—North drift has required some timbering, but has been advanced six feet; no change in amount or quantity of ore extracted since last report.

MONO.—The west crosscut, No. 2, was driven 10 feet in hard blasting rock.

Nevada.

THE OMAHA AND LONE JACK MINES.—Grass Valley Union, May 13: Among the other idle mining properties upon which work will be resumed this season in the Grass Valley district are the Omaha and Lone Jack, which are located on the same lode, and have been consolidated under one incorporation. The Lone Jack is an old location, which dates back to 1855, and was worked as late as 1866, when, requiring stronger machinery for pumping, it was closed down, and operations were never afterward resumed. An incline shaft was sunk upon the vein to the depth of 625 feet. The average width of the vein was about 18 inches, and first and last it yielded a considerable amount of high-grade rock. In 1862 there was a crushing made of 1300 tons of quartz, which gave an average yield of \$62 per ton; and the full yield of the mine up to the time it was shut down was upward of \$500,000. For many years the Lone Jack was the property of Cyrus T. Wheeler, of Sacramento. The Omaha is a later location, and was first opened for regular working about 12 years ago. A large amount of ore was extracted, and the incline shaft sunk to the depth of 500 feet. Drifts were run south toward the Lone Jack, and it has always been the supposition that the existence of the pay chute in that direction was demonstrated and showed the necessity of the consolidation of the two properties, which could not be accomplished at that time. By consolidation, there is no doubt that the property can be worked to a profit, and the openings that have already been made will enable quartz to be taken out as soon as the Omaha shaft is freed from water. The machinery will be operated by water-power, which will lessen expenses over what was incurred when the mine was formerly carried on. The McCreary brothers, of Sacramento, are large owners in the new company. Preparations for work will soon be made.

DEBRIS DAMS AT OMEGA.—Transcript, May 12: Some Chinamen have taken possession of the old Omega gravel claim in Washington township, and are hydraulicking with good results. The results are good because a great deal of gold is being taken out, and no harm is being done, neither is any order of court being trespassed. To hold back the debris, there is in the main outlet a timber dam 175 feet long and 18 feet high, and above this at intervals, three brush dams, each approximating 125 feet in length and 6 feet in height. There are two other brush dams in branches of the stream through which the tailings might otherwise escape. These structures impound the tailings effectually, and anti-miners who have been there to observe the operations cannot help admitting it.

Placer.

FOREST HILL.—Cor. Placer Argus, May 11: The Mountain Tunnel machinery being in need of repairs and cleaning, they have been idle this week. Several members of the company were up a few days ago from S. F. Forest Hill will soon have a rival town; that ancient burg with the euphonious name of Yankee Jims is looting up, awaking from

its long sleep, and ere many more years roll around, will once more be a booming mining camp.

Plumas.

LOCATIONS.—Greenview Bulletin, May 11: Business seems to be lively at the Indian Valley mine, through not of an encouraging character. Several days ago Judge Emmons made a quartz location, which takes in the ground on which the mill, dwelling-houses, etc., are situated. We also learn that D. A. McKenzie has made a location called the Empire claim, which adjoins the Union, and takes in what has been known as the "Hidden Treasure." This location also includes the mill, dwellings, etc., belonging to the Indian Valley mine. All such moves as these bode evil as far as the operation of the Indian Valley mine is concerned. The practical result will probably be to involve the mine in litigation, which has been the great evil of too many enterprises of this section. The Indian Valley mine is fully equipped for operation, and it is too bad that it should be tied up with legal entanglements.

San Bernardino.

CALICO.—Print, May 14: The chlorides on the Bismarck, Oriental, Thunderer, Pinto, Veto, Blackfoot, and a number of other claims, are doing well on an average, but few making less than \$4 a day to the man and some clearing \$20 or \$30. Jas. Harper's force of men on the Iron Clad are doing considerable work blasting and sinking, with indications of being amply rewarded for their labor. Taft & Knapp have struck a good pay streak in the Little Waterman in West Calico, after having done considerable deadwork in order to reach the ledge. The ore is of a fine grade and appears to be in paying quantities. The leaching works of Lefurgey & Co. and Reed & Co. are reducing ore to their full capacity, netting their owners fair profits. The Waterloo continues to show up extensive bodies of rich ore on the average, occasionally pockets being discovered of a very high grade. The mine keeps 15 stamps busy night and day, and as soon as the new mill is completed, it will keep 15 or 20 more stamps in constant operation and require a large force of men to develop the mine. The Silver Odessa employs its usual number of men, and keeps the company's 15-stamp mill in almost constant operation, netting several thousand dollars every week. The mine is being systematically developed, and shows ore at a depth of 200 feet. Prospecting below that depth will be commenced when the ore is exhausted above it. Barber's force of men on the Total Wreck group of mines is doing some efficient work, and while prospecting for large bodies of ore have taken out a few tons of ore that have given good returns at the mill. Mr. Barber is pushing operations as rapidly as possible, so as to lose no time in finding out whether it will pay to erect a smelter in the vicinity of his mines. It is the opinion of some experienced miners that the mines in West Calico will prove more extensive and lasting than any others in the district. There are about 75 men working in the Garfield group of mines, a majority of whom are prospecting and opening up new bodies of ore, while the rest keep the company's 15-stamp mill supplied with ore sufficient to keep it in constant operation. Most of the ore is taken above the 200-foot level, and there seems to be enough in sight to keep the present mill running for several years. Judging from present indications the output from this group will run up in the millions before the mines will show any signs of exhaustion.

San Diego.

JULIAN DISTRICT.—Julian Sentinel, May 13: The Strong & Blue Jay is getting out about eight tons of fine-looking ore every day. It assays from \$30 to \$35 per ton. It is located just at the edge of town. J. R. Farrell arrived here this week, and entered upon his duties as superintendent of the Owens mine. Mr. Farrell held this same position here about a year ago, and the miners were all glad of his return.

Shasta.

BULLYCHOOP.—Cor. Index, May 14: The Cumberland Mining Co. has struck a bonanza just south of and adjoining their shaft on the True Auger ledge. In making a cut they struck a vein of white quartz very rich in free gold, and about 30 inches wide, and one can't pick up a piece of the quartz in which gold cannot be seen. I am sure it will work from \$50 to \$60 per ton. They have sunk down about 12 feet, and it is holding full as good or better as they go down.

GOOD YIELD.—Shasta Courier, May 14: The Johnson and Tom Greene mine, a mile and a half north of town, and on which a cannon-ball mill is run by steam power, is turning out splendidly. The ledge is well defined, and yields \$280 to the ton. Doctor Ed Reese was off his base when he sold that Aftermath two years ago for \$150.

PROSPECTING for quartz ledges near town is on the increase. During the past few weeks many valuable ledges have been discovered within a mile or two of town; one by Bell, Hopping, and Hammond, just south of town; and Dunn brothers, in Rock Creek valley; and Johnson & Co., near the hospital. All of these discoveries show free gold, and are said to be rich.

MORE OF IT.—Hammond, last week, broke through the back of a horse which he encountered in his mine on the hill this side of Lower Springs, and two miles from Shasta, and just struck it too everlasting rich. The ledge is traceable by surface croppings a distance of 80 yards, and at the depth of 20 feet shows a well-united ledge of seven feet in width. Yesterday, Thomas Greene showed us the result of an assay from rock from this discovery which showed a test of \$850 to the ton.

Sierra.

CLEANUP.—Sierra Tribune, May 14: A cleanup of between \$9000 and \$10,000 was made at the Cleveland mine last Monday. This is the biggest yield the mine ever made, and it speaks volumes as to the value of the property.

HOWLAND FLAT.—Mountain Messenger, May 14: Lincoln Co. at Howland Flat has good prospects, and will do well in their drift claim this year. Virginia Co. is vigorously pushing their tunnel through bedrock, and expects soon to reach the gold lead, believed to extend toward Mt. Fillmore.

Trinity.

NEW ENTERPRISE.—Journal, May 14: Wm. Fowler has been appointed supt. of the company formed for running a tunnel through the point opposite

French creek on the Trinity river, to divert the course of the river and then work the exposed bed. From him we gather the following particulars: Work will begin shortly on the operation, as Mr. John Bamber, who has taken the contract for digging the tunnel, arrived in town Monday and proceeded at once to his destination. He took with him about 1200 pounds of tools and material, the rest being already shipped. The tunnel will be 404.7 ft. in length, the open cut at the inlet will be 75 ft. in length, and at the outlet 178 ft.; the said tunnel to conform to the survey made by W. S. Lowden last fall, and to be 16 ft. wide and 6 ft. high and perfectly straight from inlet to outlet. According to the terms of the contract, the tunnel and open cuts must be completed by Jan. 1, 1888; allowance will be made, however, for any unexpected or unusual "raise" of the river that will prevent work being carried on. It is thought that about 20 men will be employed and the enterprise will undoubtedly be of considerable benefit to that section of the county.

A NEW QUARTZ-MILL.—From Mr. L. Caster we obtain the following particulars in regard to the new mill recently erected on the Venicia mine: The building is a substantial frame structure 64 ft. by 40 ft., 40 ft. high, and has a sheet-iron roof. The mill is a five-foot Huntington, with a 15-horse power engine; it has four Frue concentrators and a rock-breaker, and has a capacity of 15 tons every 24 hours. With the exception of the concentrators, all of the machinery is of the latest improved F. A. Huntington's.

Tuolumne.

THE HYDE MINE.—Union Democrat, May 13: It is reported on good authority that the Hyde mine has been sold, together with the ranch inclosing it, to an association of gentlemen in Alameda county—Messrs. Greene, Reynolds and others—and that the agreement of sale provides that work shall be started on the mine at an early day. Tuolumne county is feeling the revival in mining matters as well as other mining counties of the State, and justly so, for her mines stand on merit, as the records of the past show. Senator J. P. Jones, Mr. Alvinza Hayward and other experienced gentlemen of large means have lately invested in her mines, and the investments are not for speculation but for development and work, and legitimate profits.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Alta, May 18: One-half of the force of miners is still employed repairing the Chollar incline above the 1300-foot level. On the 1200 level the north drift has been advanced 35 feet, and has been connected with the shaft of the Savage mine, at its old ninth station. The west crosscut No. 3 on this level has been extended and timbered 25 feet in favorable vein material. East crosscut No. 1 on the fifth station level was advanced 30 feet.

SAVAGE.—The upraise from the 600-foot level in the ore body has been completed to the 50-foot level, and the ore shoot finished to that level. The winze below the 600-foot level was sunk and timbered 10 feet, and its depth is now 95 feet below that level. On the 800-foot level, one, east crosscut from the main south drift has been advanced 20 feet, its length now being 134. The upraise in the quartz body from this level was extended 14 feet. On the 1200-foot level the north drift was advanced 35 feet, and connections made with the ninth station of the shaft. No. 3 west crosscut on this level was continued 24 feet, and its length is now 191 feet.

Antelope District.

VALUABLE MINES DEEDED.—Eureka Sentinel, May 14: Deeds to the following-named mining properties were yesterday recorded in the recorder's office of this county: William and Katie Whalen to the St. Peter's Con. Gold and Silver Min. Co., Chicago. The St. Peter's mine, the Goddess of Liberty mine, the St. Patrick mine, and the Greyhound mine. Consideration, \$1,000,000 each, or the sum total of \$5,000,000. The mines are in this county.

Bernice District.

SILVER.—Cor. Reno Journal, May 12: The silver mines of Bernice, owned by Mr. Williams, have again been started up, and a new improved 10-stamp mill erected with furnaces and other machinery necessary for the reduction of his ores. This will stimulate mining, and many new discoveries will be opened out, and either reduced upon the mine or shipped to Reno. It has been a conundrum for the past year why the Nickel and Cobalt properties, situated in Cottonwood canyon, owned by the National Nickel Co., have not been started up; but we are now assured by Mr. Talmadge, who has just examined the property, that operations will be started during the present month and that a complete plant will be put up for the reduction of 40 tons per day.

Eureka District.

THE BULLY BOY.—Sentinel, May 14: This is one of the early-day locations of the district, now being worked under lease by Spence & Company. It had lain idle for years, until Mr. Spence, who thought he knew something about it, took a lease and went to work on it. He has made one good shipment of ore, and lately the mine has been improving, so that it has become necessary to build a road to get the ore out. The road being completed, Mr. Spence will commence shipping ore in a few days. The mine was formerly owned by George McCullough, but is now the property of A. Jackson.

THE SILVER LICK.—Sentinel, May 12: The Silver Lick mine, on Adams Hill, under the able management of Supt. A. B. Davis, is looking well at present, and has lately shown signs of improvement of a most substantial character. The yield of ore is increasing, and the value of it is rather exceptional for richness as compared with the ores of most of the other mines of the district. The Silver Lick has been a steady producer for a number of years.

ORE SHIPMENTS.—Sentinel, May 15: During the past week ore shipments were made from the mines of the district to the Richmond Works—Silver Lick mine, 22 tons; Williamsburg, 5 tons; White Pine, 7 tons; Hamburg, 45 tons; Members, 32 tons; Marguerite, 7 tons; Dunderberg, 49 tons; Eureka Star, 1 ton; Silver State, 1 ton; Diamond, 5 tons; Alexandria, 11 tons; Adelphi, 6 tons. Eureka Con.—Alexandria mine, 14½ tons; Woodchopper,

22½ tons; Diamond, 20 tons; Harris, 2 tons; General Lee, 4½ tons.

Marble Falls District.

TO RESUME.—Belmont *Courier*, May 14: It is said that work will soon be resumed on some of the mining claims at Marble Falls in the western portion of Nye county. The ore carries gold and silver, and we are informed that it is the intention of the owners to thoroughly prospect their claims this year.

Marietta District.

ORE SHIPMENTS.—Esmeralda *News*, May 13: M. M. Constock has five men at work on the Champion mine, and will ship ten tons of ore therefrom to the Selby Reduction Works about the 1st of next month. He expects the ore to net \$700 per ton. J. C. Meining has a few men working on the Black Giant; the ore is rich. He will make a shipment of ten tons of ore to the Selby Works to-morrow. There are several men chloriding who are extracting small batches of ore.

Northumberland District.

YIELDING.—Belmont *Courier*, May 14: Mining is progressing finely in Northumberland, and the mines continue to yield the usual quantity of rich ore.

Ophir Canyon District.

ORE.—Belmont *Courier*, May 14: Everything is running finely in the Chicago M. & R. Co.'s mine in Ophir canyon. The ore bodies recently discovered in the 120 soil level and in the 4th level, 240 feet from the surface, are proving very rich and extensive. Ore, in large quantities, is being hoisted to the surface and hauled to the mill for reduction. The mill will soon be running again.

Philadelphia District.

SALE.—Belmont *Courier*, May 14: On May 5, 1887, the Belmont Mining Co. transferred all its mining property and all real and personal property to Ferdinand Reis, of S. F., Cal., consisting of mines and mining claims, hoisting works, dumps, tools, assay scales, office fixtures, furniture, etc., half interest in Monitor-Belmont, 20-stamp quartz-mill, water rights, blacksmith shop, office building, etc.

Pine Grove District.

YIELDING GOOD ORE.—Esmeralda *News*, May 13: The mines at Pine Grove are yielding considerable good ore, and are attracting the attention of capitalists. They are now being worked by the tributaries, who are making money. It speaks well for a camp when poor men are willing to devote their labor and take chances, but thus far the miners have made, in many instances, triple the amount of daily wages and have made the properties worked a source of considerable income to their owners.

Reveille District.

FURNACE.—Belmont *Courier*, May 14: Archer Moore is building a furnace in Reveille for George E. Clarke. Norris Bros. are taking out very rich ore, and will soon start up the Gila mill.

San Antonio District.

PROSPECTING.—Belmont *Courier*, May 14: Prospecting is progressing satisfactorily in the mines of San Antonio.

Spanish Belt District.

ORE SHIPMENT.—Belmont *Courier*, May 14: Another large load of rich ore from the Barcelona mine, at Spanish Belt, was shipped last Sunday to Salt Lake for reduction. Work is pushed with energy, and it is the intention of the present management to develop the property into a first-class mine.

Tuscarora District.

NORTH BELLE ISLE.—Times-Review, May 15: North gangway from the south incline has been advanced 20 feet; the formation remains the same. Everything in and about the mine is progressing well.

BELLE ISLE.—The line crosscut on the 150-foot level has been advanced four feet, north drift from the same has been extended seven feet; the face shows better breaking ground.

NAVAJO.—The south drift on the west vein 150-foot level has been advanced nine feet. South drift from the Johnson crosscut has been advanced seven feet. Fair progress has been made with the work on the 350-foot level.

NEVADA QUEEN.—The machinery was started Sunday; water has all been taken out, and sinking resumed in the shaft. North gangway has been extended 46 feet; 70-foot level has been advanced 12 feet; slight seepage of water in the face. Lumber for shaft-house will be here next week.

Tybo District.

AT WORK.—Cor. Belmont *Courier*, May 14: Mr. Dimick has now out nearly, if not quite, 300 tons, and expects to increase that amount largely before the mill is ready to commence its reduction. A recent visit to his mine showed stopes of fine ore where eight men could readily be employed, and upon the completion of the air-shaft, which is now nearly through, and all the way in ore, several more could be put to work to good advantage, when the output should amount to about 10 tons per day. Mr. Trowbridge has now in his ore bins at the mine 375 tons of low-grade ore, and nearly as much more awaiting removal from the mine. When the mill starts it is expected that there will be no stoppage for at least 40 days, and present prospects point to the second run of as many days before the summer is ended. Immediately after the run of the mill Mr. Trowbridge proposes to commence taking the water from the 2-G mine, and will push the work to the utmost, as it is his intention to prospect the lower levels and prove the value of this famous mine before the snow flies again.

Wild Rose District.

PARADISE VALLEY.—Silver State, May 11: For week milling ore produced and delivered to the mill, Paradise mine, 65,920 pounds; Wild Goose mine, 52,750; total, 59 tons, 670 pounds. Average assay value, per ton, 34.34 ounces silver; 0.19 ounces gold. Mill run 168 hours and reduced 84 tons ore and 59 tons blanket sweepings. Concentrates produced 485 sacks, 34,486 pounds, par value \$6166.61, which was shipped to the Reno Smelting, Milling and Reduction Works, Reno, Nevada. Mill work—Three Huntington centrifugal roller-mills; six Triumph concentrators. Number of men on payroll, 107. Have commenced to sink engine shaft again, and will go 100 feet deeper and open No. 4 or 400-foot level. Had considerable trouble in get-

ting men on the start, but now have on the work our old miners, who sunk the shaft from the beginning, and we will hereafter show good progress in sinking. The west side of the shaft in the bottom shows a well-defined wall. The south drift, 200-foot level, shows strong indications of the near approach to ore.

ARIZONA.

MOHAVE MINES.—*Miner*, May 14: The 700-foot tunnel on the Intallible mine at Stockton Hill has recently been cleaned out and retimbered by Messrs. Southwick and Hatch, preparatory to further developing the mine. On the celebrated Lone Star mine at Mineral Park, which is now being worked by Addison & Co. under a lease, the lessees have a fine streak of ore varying in width from six to eight inches. Oliver Bros. are running in a new tunnel from the bottom of the wash on the Prosperity mine at Todd Basin. On the Rural, at Mineral Park, work is still being carried on as vigorously as possible. Water is now coming in so fast that three shifts of two men each can hardly keep it below the platform. A Baker mining hoist will be placed in position in a few days, after which more men will be put on. A carload of ore will be ready for shipment in a few days, which is expected to average from \$200 to \$1500 per ton. On the Rough Ashler claim, Todd Basin, the lessees are taking out a very good grade of gold ore and plenty of it. Jones and Murphy, who recently purchased the southeast extension of the wonderful Christie mine, at Mineral Park, have struck a two-inch streak of ore assaying from \$1800 to \$2000, and being almost identical with the ore from the Christie mine. Messrs. Brandon and Fogarty are hard at work on the Primrose mine, Todd Basin, and are taking out lots of ore, some of which assays as high as \$800. The transfer of the Signal mine and mill by Hugo Richards and others to the new company has been completed, the consideration being in the neighborhood of \$65,000. Beecher & Co.'s 10-mule team leaves Kingman to-day for the Lost Basin with 8000 pounds of lime and other supplies for the Golden Gate M. & M. Co. John Burt had a couple of tons of ore from the Congress mine, Cedar district, worked during the week. Louis Davidson brought over a couple of tons of the well-known Baden-Baden ore. The C. O. D. mine sent down two carloads this week instead of one, by way of a change. Tom McMahon, who has a lease on the Prince George mine, brought down five tons of ore last week, which went away up. Brown & Roe brought in a couple of tons of fine ore from a claim at Lorena flat below Stockton Hill. Hussey & Co. sent over 12 tons from the Minnesota mine, near Mineral Park, which went about \$500 per ton.

MINING SALE.—Mojave *Miner*, May 7: We learn from Judge Murphy, one of the owners, that the Flores group of mines has been sold. These mines are near Cerbat, and about 12 miles from Kingman, and are named the Flores, Idaho, Vanderbilt and Eureka claims, and are owned by W. C. Parsons, the well-known Tombstone capitalist, in connection with Messrs. E. F. Thompson, Henry Raymond and Judge Murphy, who realize \$60,000 from the sale. The purchasers of this valuable group of mines are New York, Maryland and Pennsylvania capitalists, who propose to expend \$100,000 on the mines immediately. A mill of 20 stamps, with capacity for 40 or 60 more in the future, is to be erected at once on the Flores, where the company owns a fine spring of water, which, with a little improving, will furnish abundance of water for milling purposes. All of these mines have been sufficiently developed to expose large bodies of ore showing free gold, which will mill from \$20 to \$60 per ton and upward.

NOTES.—Prescott *Courier*, May 14: The large pump which Capt. Eagan sent out from San Francisco is being hauled to the Peck mine, and will soon be engaged in drying the property. Miners feel certain that, when dried, the mine and its sister, the Occident, will produce thousands of tons of rich ore. Frank Ryland and his partner have been astraining gold rock from the Southern Belle mine. Rock paid them well. Mr. Jones, of Groom Creek district, is working hard, getting the Azlan mill in condition to crush ore. He will test his mines and then add such machinery as may be required to save the gold. Capt. Brann and Mr. N. Ellis went to Turkey Creek district yesterday. Mr. Ellis may purchase a mill for his Squaw creek mine. John Quinlan and C. P. Fitzgerald are crosscutting what they call the God and Hammer ledge, in Turkey Creek district. Ledge is 2½ feet thick, and assays from \$280 to \$500 a ton in silver. Mr. Quinlan tells us that rich ore is being taken out of the Roach mine. Mr. J. L. Fisher examined mines in Cherry Creek district recently, and believes that they are as good as any he has ever seen. Mines of Centennial district, Yuma county, are attracting attention. They are rich in gold.

COLORADO.

SILVERTON NOTES.—*Miner*, May 14: The Oriental is to be extensively worked this season. The Caribou mine at Ophir has about 500 tons of ore on the dump, awaiting shipment. A great deal of interest seems to be concentrating on the Cement creek region, and we look for a large amount of development work in that direction. A small force of three men are working Perry Fisher's property on the south fork of Cement creek. Some very rich gold quartz was extracted last year. The North Star and Yellow Jacket, two of King Solomon mountain's richest mines, will ship to Silverton not less than 4000 tons of high-grade ore this year. Mr. Riggs, of the Indiana and Kentucky mines, in Gray Copper Falls gulch, reports the mines looking first-rate. He will soon begin to ship. Wyman & Co. have contracted with Thompson & Klein, lessees of the Belcher mine, for the packing of 1500 tons of ore this season. The Montezuma and Terrible mines, at Ophir, have several hundred tons of ore out, which will be sent over the range to Silverton in a few days, or as soon as the trail will be open for pack animals. The Great Eastern will be an important shipper of ore this season. The ore already on the dump amounts to hundreds of tons, which is scarcely a marker compared with that in sight in the mine. Charley Handy will start the Red Cloud stamp-mill in Swamp canyon, near Ophir, at once, on a trial run. Twenty-five tons of the gold quartz will be run through, and if the test proves satisfac-

tory, another mill of the same manufacture will be erected at a more convenient point.

IDAHO.

SALE OF THE JARVIS.—*Challis Messenger*, May 12: A. Sargent has sold his one-half interest in the Jarvis claim, near Bayhorse, to C. E. Taylor. Consideration, \$4000. The other half of this property is owned by Jack Adams. This is one of Bayhorse's good properties and only needs sufficient development to make a mine of it. The developments already made prove that it carries a 20-foot vein of white quartz with sufficient galena and silver in it to pay for concentrating almost the entire width from wall to wall, and a small portion of which is high enough in lead and silver to pay well for reducing without concentrating. Besides this immense and continuous body of low-grade ore, the lode carries a vein of from two to eight inches of copper-silver ore, on the hanging-wall, which smelter returns show averages 300 ozs. in silver per ton.

LOWER SALMON.—Fred Phillips has just returned from the Dynamo or Big creek country. At Dynamo there are 47 men employed in and around the company's mines; and it is generally thought there that this year will be a productive one among the placers. The two 10-stamp mills—one on the Kentucky mine and the other on the Grunter—are doing very well. Each one is crushing its usual amount of good ore; and it is particularly pleasing to hear that both mines are holding their richness and increasing in size as they are zoned down upon. As far as Mr. Phillips could see of all this lower country, it is gaining in importance of mineral production every day.

AT WAGONTOWN.—*Idaho Avalanche*, May 14: The Wilson lode at Wagontown is showing up splendidly, and from every appearance, will prove a genuine bonanza. Work is being pushed as rapidly as possible, and as depth is gained, the lode grows larger and richer. Capt. De Lamar is very sanguine that he will develop a property in the Wilson mine second to none in Idaho. Enough ore is said to be in sight to keep a mill of 100 tons capacity running steadily for two years. As soon as possible a shaft will be commenced at or near the junction of the tunnel with the lode. Miners are being put on as fast as there is room for them.

THE EMERY MINE.—*Inter-Idaho*, May 11: The Emery mine, on Deer creek, is fast developing into a huge ore-producer. Yesterday a specimen chunk of ore was brought down to Hailey, which weighs 540 pounds and is exceedingly rich in silver. They have a large amount of similar ore on the dump ready for shipment, and a gentleman who visited the works informs us that there is now in sight in the mine at least 200 tons of ore which will go 100 ounces silver to the ton. J. W. Burns and Ed. Flannery are the principal owners.

STRIKE IN THE CAMAS NOS. 2.—Wood River *Times*, May 11: Pieces of ore from the new strike in the bottom of the Camas Nos. 2 shaft, a couple of days ago, were shown around town to-day. They show iron pyrites, red and brown oxide of copper, and some free gold. It is very good and very rich ore—although not even a fire assay could determine its yield under stamps.

MONTANA.

NEIGHBORING MINES.—*Anaconda Review*, May 14: The event this week in mining business has been the strike in the Katie Darling. This mine is located on Carbonate hill, and is the next claim but one to the Blue-Eyed Nellie. It has always been considered a very promising mine. The shaft is now down to a depth of 65 feet, and has been worked by three men up to this time. Near the top some very rich ore was taken out, but lower down the rock did not seem so rich. On Monday they were drifting from the 65-foot level, and had gone only ten feet when they struck a very rich body of ore, which seems to be of large extent. Samples of the ore were brought into our office yesterday, and it would be hard to distinguish them from the Blue-Eyed Nellie rock. The mine is owned by D. Shovelin, J. Burns, Dent McGowan and John Monigal. They intend to put on a large force of men right away, and develop the property to its full extent. As soon as a sufficient quantity of ore can be taken out it will be shipped for treatment, and then an accurate estimate of the value of the mine can be formed. There can be no doubt that the Katie Darling is a very valuable mine. There is a general impression that a silver-mill will be put up on Carbonate hill this season, and that it will be built by parties who have money. The snow still hinders mining operations west of Anaconda, but a number of prospectors are busy notwithstanding.

WAGONTOWN MINES.—*Silver City Avalanche*, May 7: The Wagontown mines were discovered in 1875, when considerable work was done in developing them on the surface, and to depths not exceeding 75 feet. The consequence was that the camp lay comparatively idle for several years, and not until Captain J. R. De Lamar purchased the Wilson lode were the mines worked on a systematic scale, with a view of proving their value at considerable depths. The late developments in the Wilson mine prove it to be one of the best properties in Idaho Territory, not by reason of the richness of ore, but because it has been proven to contain large quantities of low-grade gold ore. The second lode has been cut at a depth of nearly 300 feet from the surface, where the ledge averages 12 feet wide, of ore that will pay handsomely, if milled at Wagontown. The manager of the mine, Captain De Lamar, informs us that he can now figure 30,000 tons of ore in sight. The ditch to convey water to the mill, to be erected, was commenced last fall, and will soon be completed at several thousand dollars expense.

THE LOWER WORKS.—*Anaconda Review*, May 14: A representative of the *Review* went down to the lower works this week to see what was going on there. A force of 50 or 75 men is now at work taking the machinery from the track up into the immense building. The machinery is constantly coming in and is being put in position as fast as it arrives. All the machinery that has come so far is for the 60-stamp silver-mill, and at the present rate of shipment the mill will be in operation before very long. The boarding-house is running at the lower works, and is presided over by I. Sparey. No one could give any definite idea of how soon the mill would be ready for operation, but the prevailing opinion is that it will only be a few weeks more until it is working.

GRANITE MOUNTAIN PRODUCTS.—*New Northwest*, May 13: We have it from direct sources that the bullion shipments from the Granite Mountain mine, for the month of April, 1887, amounted to 290,000 ounces (a little less than that number of dollars), which is a very good yield—at the rate of over three and a quarter millions for the year. The mine and mills and all machinery connected therewith are working smoothly. "Matters about Granite are bright, and everything points to a prosperous season for mining throughout Flint Creek district generally."

MURRAY.—*Butte Miner*, May 14: Mr. R. G. Huston, who has recently returned to Butte from an extended business trip, was yesterday speaking of some of the points he had visited, and among others named Murray, Idaho, as a place of great possibilities. "Whenever facilities are developed for working the Old Wash," he said, "it yields handsome results, and capital will no doubt take hold of the upper ditch at some time and finish it to the higher bars. Below Murray they are still working the placers in Buckskin, Missoula, and Dream gulches. These, of course, do not furnish employment to many men. Just at the time I visited the camp all the quartz-mills were shut down but three. All anticipated starting up soon. The far-famed Mother Lode, Treasure Box and Occident were all running their armstas and were doing well. The Treasure Box is one in reality, as the owners pounded out with a hand mortar this winter nearly \$15,000—good enough without a mill. The curse of this country has been the litigation carried on. Every property is or has been claimed by two or three different parties, and thus they get wrapped in an endless lawsuit. I think this thing of men going into a mining camp and locating for all their sisters, cousins and aunts is not just the thing to preserve good order and feeling among the pioneers. Frank Reed's Buckeye Boy, in Dream gulch, is an exception to the general rule. No one seems to be at law with him for a share of his good fortune. He has some of the finest ore in the camp; keeps up his grub stake, he says, by pounding it out in a mortar. He has done a large amount of work on his mine, and will show it up to some man's satisfaction at an early day."

NEW MEXICO.

FLORENCE.—*Scotts Bullion*, May 12: The Florence Mining Co. has commenced work on their properties in the Water canyon, they having secured the Jane Bowman and Texas Ranger, two as promising prospects as are now to be seen in that noted district. Mr. Boswell, of St. Louis, and a member of the company, arrived Thursday, and will put a large force of men at work immediately. Mr. John Bailey came in last week and placed before us some fine specimens of argentiferous gray copper ore from his Hop canyon group of mines, which he owns with Frank Ryan. It runs 25 ounces silver, 20 per cent copper and one-half gold. The ore body from which it is drawn is 12 inches in width. These gentlemen have invested \$2000 in work and will continue to develop until the property is in a shape to produce economically.

OREGON.

SILVER CREEK.—*Bedrock Democrat*, May 12: The recent bonding of the Cabel Bros.' group of mines, and Graham & Co.'s Golden Monarch mine, in the Silver Creek mining district, by gentlemen representing Eastern capital, lifts, in a great measure, the obscure cloud that has enshrouded the district in the past. That the mineral deposits of the Silver Creek country are rich and extensive, there can be no longer a question. A visit to the section will allay any misgivings had regarding them. The deposits show for themselves, and the extent of development work done is sufficient to assure a correct estimation of their value. We predict a boom for this mining district, and that, too, before many days. Scores of Eastern mining men have been advised of the richness of the camp, and many of them are turning their attention in this direction.

UTAH.

REVIEW.—*Salt Lake Tribune*, May 13: The receipts in this city for the week ending May 11th, inclusive, were \$109,804.82, of which \$60,250 was ore and \$49,554.82 was bullion. For the week previous the receipts were \$53,900 in ore and \$9,925.81 in bullion, a total of \$103,825.81. The output of the Ontario for the week was 39 bars of bullion, 23,112.67 fine ounces, and \$19,423.58 ore sales, a total, approximately, of \$42,536.25. The daily product for the week was six bars of bullion, 838.85 fine ounces, and \$14,835.33 ore sales, an approximate total of \$23,674.18. Fine bar receipts of the week were to the value of \$13,019.82; base bullion, \$8300. The Hanauer smelter product of the week was \$18,585 worth of bullion. The Horn Silver is shipping some cars of ore occasionally—enough, as understood, to pay expenses, but neither the value of the ore nor the expense account is allowed publicly. Ore receipts in this city for the week were \$16,150 by Wells, Fargo & Co., and \$44,100 by McCormick & Co., including \$7700 Crescent.

PARK NOTES.—*Record*, May 14: Ere long when the new machinery is in working order, nearly double the present force of miners and timbermen can be employed to advantage in the Daly shalts, drifts and stopes. The Crescent is advertising to sell on contract its mine and concentrator product for the next year. The rest of the Crescent machinery, which is being supplied by the Utah & Montana Machinery Company, is expected daily. A large No. 7 Burleigh air compressor, of 60,000 pounds, has been ordered for the Daly. Pipes are being laid at the Ontario, preparatory to washing away the dump as is done every spring. The Crescent concentrator and tramway are running full blast. Machine shops are soon to be erected at the Anchor. During the week the Crescent shipped 422,825 pounds of first-class ore and 120,725 pounds of concentrates. For the week just ended the Mackintosh sampler received 616,850 pounds of Ontario, and 25,050 pounds of Daly ore. The Ontario bullion product for the week was 39 bars shipped on the 9th, containing 20,801 fine ounces of silver. The Marsac mill turned out last Monday six bars of Daly bullion, 6963 fine silver ounces, and this morning seven silver bars containing 8269 fine ounces were shipped.

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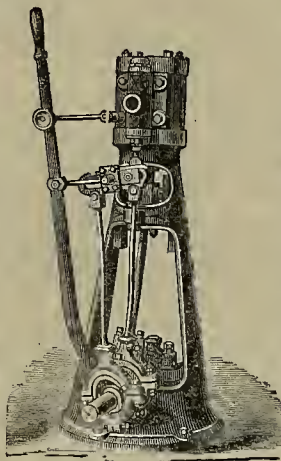
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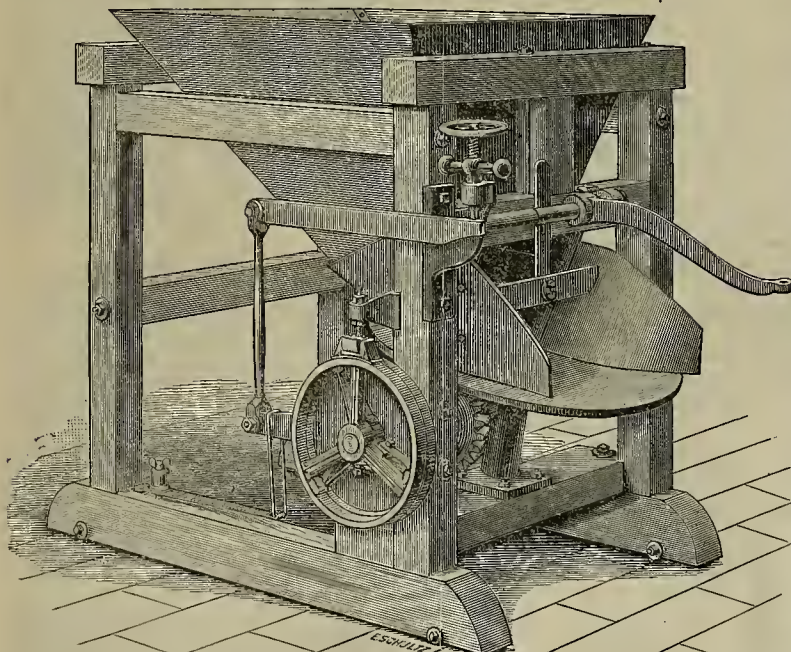
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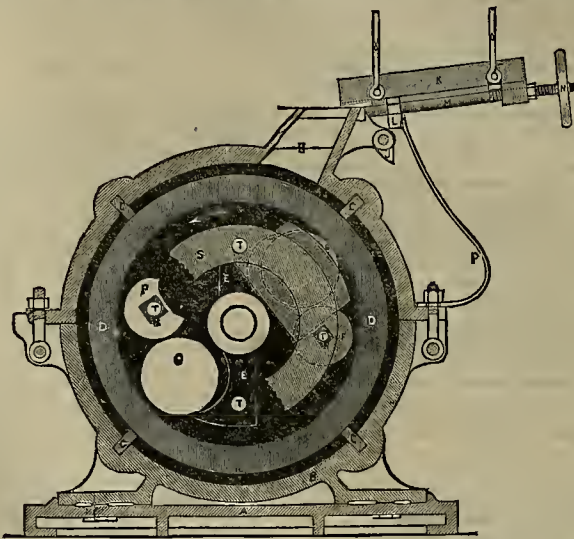
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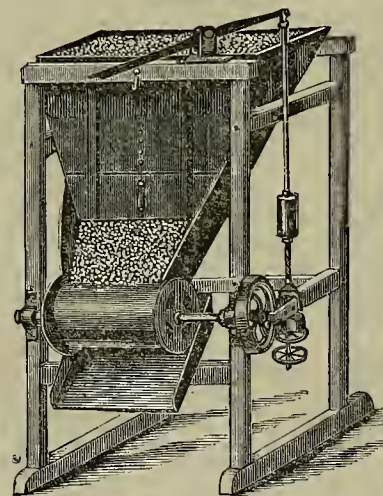
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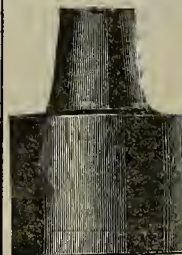
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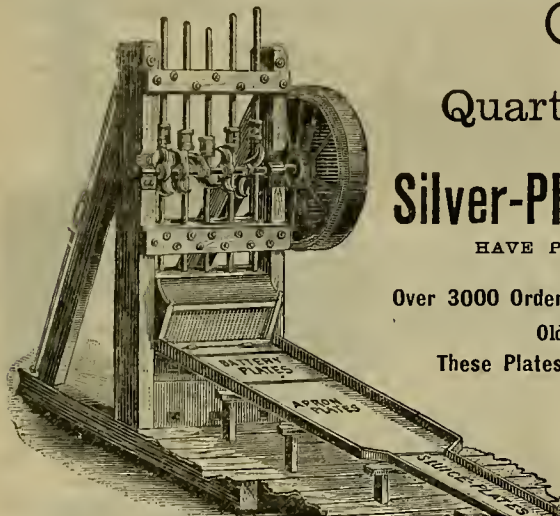
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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

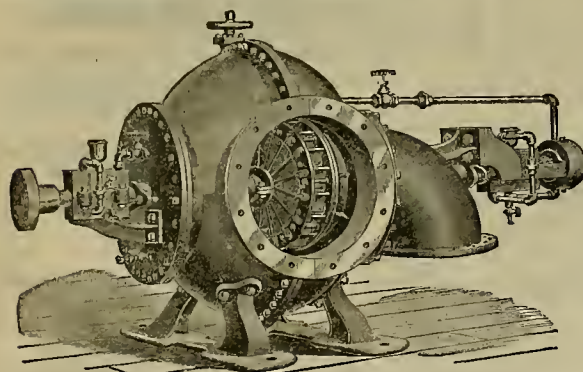
JAMES LEFFEL & CO.,

Springfield, Ohio,

or 110 Liberty St., New York.

FRASER & CHALMERS, General Agents,
Chicago, Ill., and Denver, Col.

PARKE & LACY, General Agents, San Francisco, Cal.



DR. PIERCE'S ELECTRIC BELT
Only Perfect Body Battery ever invented. Gives an Electric Current without the use of ACOIDS. ELECTRIC SUSPENSORY. Estab. 1875. Send for FREE with every Belt. Free Pamphlet No. 2. Address, MACNETIC ELASTIC TRUSS CO., 304 NORTH SIXTH STREET, ST. LOUIS, MO. 704 BAYMONT ST., SAN FRANCISCO, CAL.

San Francisco Cordage Factory.
Established 1856.

Constantly on hand a full assortment of Manila Ropes, Sisal Ropes, Tarred Manila Ropes, Hay Ropes, Whal Line, etc., etc.

Extra sizes and lengths made to order on short notice. TUBBS & CO.
611 and 613 Front St., San Francisco

DEWEY & CO.'S SCIENTIFIC PRESS PATENT
Labeled and most successful on the Pacific Coast. No. 220 Market St. Elevator 12 Front St., S. F.

THOMAS PRICE'S ASSAY OFFICE,
CHEMICAL LABORATORY,
BULLION ROOMS and ORE FLOORS,

524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING MAY 10, 1887.

- 362,706.—CURTAIN FIXTURE—Chas. Bell, Tacoma, W. T.
- 362,919.—ADJUSTABLE STOVE GRATE—H. W. Bodeman, S. F.
- 362,489.—HOISTING MACHINE—T. A. Byler, S. F.
- 362,736.—FRUIT-DRIER—G. A. & C. F. Fleming, San Jose, Cal.
- 362,650.—FRUIT-PICKER—M. H. Murphy, Portland, Ogn.
- 362,653.—ELEVATOR—A. G. Page, S. F.
- 362,654.—ELEVATOR—A. G. Page, S. F.
- 362,855.—DIRECT-ACTING ENGINE—Jos. Pracy, S. F.
- 362,904.—FEEDWATER HEATER—Paul Rossiter, S. F.
- 362,861.—RAILWAY RAIL-JOINT FASTENING—W. L. Van Harlingen, S. F.
- 362,809.—FAUCET HOLE AND STOPPER—W. L. Woodley, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court Department to, San Francisco:

GRENOBLE M. Co., May 14. Capital stock, \$400,000. Directors—W. B. Murdoch, F. E. Jewell, D. B. Arthur, E. Marten Smith, John Henderson.

ANACONDA M. Co., May 14. Object, to do a general mining, banking, commercial, and "also to carry on and transact any and all kinds of business in which natural persons may lawfully engage." Directors—James B. Haggin, Lloyd Tevis, George Hearst, Louis T. Haggin, Joseph T. Clark. Capital stock, \$20,000,000, divided into 200,000 shares.

PACIFIC IRON LATH CO., May 17. Capital stock, \$1,000,000. Directors—Geo. E. Voelkel, Chas. Butler, John Rapp, Edward Schmitt, John Weichart, Henry Ferguson and P. A. Wagner.

Mining Share Market.

During the past week, as our table of prices shows, there has been quite a little boom in stocks. The activity of the market has brought out buyers again, who hope for a continuance of the upward tendency of stocks. From what could be learned the principal reason of the strong market is that the fire in the 1400-foot level of the Con. Virginia has been controlled and virtually extinguished. It was confidently asserted upon the street that the present strength of the mining market would hold good into the summer months, although it will most assuredly have but a short duration if leading operators fail to receive satisfactory assurances of the uncovering of bodies of ore.

Con. California, Virginia and Ophir are the leading favorites for buyers, but several of the principal middle mines also have numerous believers in their value.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Argus, May 14, \$3300; Eureka Con., 14, \$19,414; Hanauer, 17, \$1000; Alice, 14, \$33,326; Bluebird, 14, \$20,480; Moulton, 8, \$15,248; Lexington, 8, \$21,008; Hanauer, 12, \$2100; Bannock, 12, \$2600; Hanauer, 13, \$4880; 14, \$2860; Alice, 15, \$14,332; Hanauer, 15, \$5600. Last week Wells, Fargo & Co. shipped from Salt Lake \$41,409, and McCormick & Co. \$67,335.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARRE C. HOAG—California.
G. W. INGALLS—Arizona.
E. L. RICHARDS—San Diego Co.
A. J. HARE—El Dorado Co.
CHAS. LEST—Alameda Co.
GEO. MCDOWELL—Ventura and Santa Barbara Cos.
J. L. DOYLE—Alameda Co.
W. J. FERMAN—Colusa Co.
SILAS PRUDEN—Colusa Co.
WILLIAM POOL—Fresno Co.
M. S. PRIME—Alameda Co.
R. G. HUNTON—Butte, Montana.
E. P. SMITH—Humboldt Co.
S. J. LITTLEFIELD—San Diego Co.
EDMUND WRIGHT—Shasta Co.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

LOOERS, says the Coos Bay News, have exhausted their vocabulary of choice words in commenting on the late winter weather. Work in the woods is at a standstill.

JAMES FINLEY, one of the owners of the Harshaw mine, Arizona, is in this city having a ten-stamp mill built.

FOREST FIRES have been raging disastrously on Cape Cod and in the northern Michigan peninsula.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO. AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Almont M Co.	Arizona.	1.	65.	Mar 30.	May 7.	May 28.	T. Harman.	350 Pine St
Confidence M Co.	Nevada.	14.	50.	Apr 7.	May 12.	June 2.	A. S. Groth.	414 California St
Central California	Cal Co., California.	4.	1.00.	Apr 27.	June 6.	June 22.	J. G. Hulst.	314 California St
Crocker M Co.	Arizona.	4.	15.	May 16.	June 22.	July 13.	A. Waterman.	309 Montgomery St
Europa M Co.	Nevada.	9.	25.	Apr 5.	May 12.	June 7.	J. Morio.	328 Montgomery St
Golden Fleece M Co.	California.	9.	10.00.	Apr 26.	June 3.	June 10.	W. J. Gleason.	Phelan Building
Hubert Concentrator Co.	California.	2.	10.	May 10.	June 16.	July 18.	M. Livingston.	230 Montgomery St
Inyo Marble Co.	California.	1.	01.	Mar 15.	May 2.	May 28.	G. F. Von Kneht.	524 California St
Julia Con M Co.	Nevada.	22.	15.	Apr 18.	May 24.	June 16.	J. Stadler.	419 California St
Mono M Co.	California.	23.	50.	Mar 31.	May 5.	June 2.	G. W. Sessions.	309 Montgomery St
Mountain Tunnel M Co.	California.	4.	05.	Apr 14.	May 23.	June 13.	A. B. Paul Jr.	523 Montgomery St
Phil Sheridan M Co.	Nevada.	1.	10.	Apr 16.	May 25.	June 15.	J. S. Scoville.	309 Montgomery St
Sierra Nevada S M Co.	Nevada.	88.	25.	Apr 13.	May 18.	June 8.	E. S. Parker.	309 Montgomery St
Scorpion S M Co.	Nevada.	21.	10.	Apr 27.	June 3.	June 24.	J. Sperry.	310 Pine St
Trojan M Co.	Nevada.	15.	10.	Apr 23.	June 2.	June 30.	J. J. Scoville.	309 Montgomery St
Union Con M Co.	Nevada.	35.	25.	Mar 31.	May 6.	May 26.	J. M. Burlington.	309 California St
Utah Con M Co.	Nevada.	1.	20.	Apr 6.	May 9.	May 26.	A. H. Fish.	309 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Crown Point M Co.	Nevada.	J. Newland.	323 Pine St.	Annual.	June 6
Mides G & S M Co.	Nevada.	T. W. Nowlin.	230 Montgomery St.	Annual.	May 23
San Francisco Copper M Co.	California.	F. E. Berler.	320 Sansome St.	Special.	June

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50.	Apr 7
Original Hidden Treasure.	Nevada.	D. A. Jennings.	401 California St.	13.	Apr 4
Plymouth Con M Co.	California.	—	New York.	25.	Apr 4
Pacific Borax, Salt & Soda Co.	California.	A. H. Clough.	431 California St.	10.	Apr 15
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	10.	Apr 15
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	May 15

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, May 19, 1887.

ANTIMONY—French Star.	91 @	—
BORAX—San Bernardino.	71 @	8
Armstrong.	—	5
Iron—Glengarnock ton.	—	27 00
Eglington ton.	—	28 00
American Soft, No. 1, 500.	—	23 00
Oregon Pig, ton.	21	00 23 00
Clippert Cap, Nos. 1 & 4.	22	00 23 50
Gray Lane White.	22	50 @
Shots, No. 1.	28	00 @
COPPER—		
Bolt.	20 @	—
Sheeting.	12 @	—
Ingot.	13 @	133
Pine Box Sheet.	12 @	20
LEAD—Pig.	—	5 @ 60
Bar.	5 @	25 50
Sheet.	8 @	—
Shot, discount 10% on 500 bag.	Drop	3 bag.
Buck, 3 bag.	2	00 @
Obilid.	2	20 @
QUICKSILVER—By the flask.	40	00 @
Flasks, new.	1	05 @
Flasks, old.	85	—
STEE—English B.	10 @	—
Black Diamond, ordinary sizes.	10 @	—
Pow.	4 @	5
Machinery.	5 @	6
Sanderson Bros.	10 @	—

New York Metal Market.

Telegraphic advices dated May 18th give the following New York prices:

BAR SILVER—95c per oz.	
BORAX—\$1.04 1/2.	
COPPER-LAKE, \$10.40.	
IRON—No. 1, \$22.00.	
LEAD—\$4.30 @ 4.35.	
QUICKSILVER—\$3.05 @ 3.10.	
The following is the latest by mail from the "New York Metal Exchange Market Report":	
COPPER—Quiet, spot closing at \$9.90 @ 10.00. Transferable Notices (Lake) issued at \$9.60 @ —. Transferable Notices (Chili Bars) issued at \$9.75.	
LEAD—Firm at \$4.45 @ 4.55 spot. Transferable Notices issued at \$4.52.	
TIN—Quiet at \$23.15 @ 23.55. Transferable notices issued at \$23.20.	
Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.	
Australian Tin, \$23.25 @ 23.50; Biliton Tin, \$23.60 @ 23.75; Banca Tin, \$23.85 @ 24.00; Baltimore Copper, \$9.05 @ 9.25; Oxford Copper, \$9.00 @ 9.25; P. C. Copper, \$10.00 @ 10.25; Foreign Lead, \$4.65 @ 4.70; Foreign Spelter, \$4.70 @ 4.75.	
MAKERS' PRICES—At tidewater. 100-ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$20.00 @ 21.50; No. 2, \$19.50 @ 21.50; Grey Forge, \$17.50 @ 19.00; Hudson River, Grade No. 1, \$21.00 @ 21.50; No. 2, \$20.00 @ 21.00; Grey Forge, \$17.50 @ 19.00; Southern, Grade No. 1, \$21.50 @ 22.00; No. 2, \$21.00 @ —; Grey Forge, — @ —.	

A Popular Stopping Place.

The Winchester house, an advertisement of which appears elsewhere, has, under the efficient management of its present proprietor, Col. John Pooley, fast forced its way into public favor. The house is strictly "temperate"—no liquor being sold on the premises. The proprietor claims to set the best table in the State for the price. The location is most central and could not be better. It is but a half block from the junction of Market, Kearny and Third streets, the three principal streets in the city. Hot and cold baths are free and a free laundry in the house for the use of families. The Winchester house coach is at the depot on the arrival of every train, and carries passengers free to the house. Col. Pooley is an old resident of this State, and well known throughout Nevada, Placer, Santa Clara and other counties of California; also at Virginia City, Pioche, Candelaria and Carson City, Nevada; also Tombstone, Arizona; being interested in mines previous to entering the hotel business some years ago.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

For Sale.

State and County Rights of a Fly Trap; warranted to keep your house free from flies. Send stamp for particulars to Z. Nevers, 203 Brannan St., San Francisco, Cal.

METALLURGIST AND ASSAYER desires a position, either in Mill or Smelter; 16 years' experience; best of reference given. Address J. W. C., 1307 Stockton St., S. F.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING APR. 28.	WEEK ENDING MAY 5.	WEEK ENDING MAY 12.	WEEK ENDING MAY 19.
Alpha.	3.50	4.70 3.40	3.65 3.50	3.75 3.00 4.30
Andes.	2.45	2.80 2.45	2.65 2.60	3.15 2.55 4.40
Argenta.	1.55	1.85 1.50	1.75 1.55	1.70 1.50 2.20
Belcher.	3.55	4.05 3.65	4.00 3.75	4.00 3.90 5.25
Bodie.	7.00	7.00	7.00	7.00 7.00 11.00
Bullion.	2.30	2.90 2.35	2.40 2.30	2.45 2.30 3.10
Baltimore.	1.00	1.15 .95	1.00 .95	1.00 .95 1.30
Belle Isle.	.75	1.00 .80	.90 .75	.75 .65 .90
Bodie Con.	2.10	2.50 2.70	3.00 2.50	2.70 2.55 2.80
Benton.	.85	1.00 .85	1.40 1.30	2.00 1.95 1.35
Bodie Tunnel.	1.15	1.30 1.30	1.40	1.30 .90 1.30
Bulwer.	.30	.30	.30	.30 .30 .30
Con. Va. & Cal.	.38	.44 1.4	1.5 1.4	.54 1.4 2.4
Challenger.	2.20	2.30 2.40	2.50 2.30	3.20 2.50 3.00
Champion.	.60	.60	.60	.60 .60 .60
Chollar.	.60	.60	.60	.60 .60 .60
Confidence.	8.00	8.00	8.50	9.00 8.50 1.00
Con. Imperial.	2.00	2.50 1.75	2.00	1.80 2.00
Crocker.	.50	.50	.50	.50 .50 .50
Con. Pacific.	.30	.30	.30	.30 .30 .30
Crown Point.	5.00	5.00	5.00	6.00 5.00 7.25
Crocker.	.85	.95 .75	.85	.80 .90 1.00
Central.	.60	.65	.60	.60 .50 .60
East B. & B.	.30	.30	.30	.30 .30 .30
Eureka Con.	.60	.60	.60	.60 .60 .60
Exchequer.	1.60	2.00 1.60	1.70 1.55	1.60 1.60 2.10
Grand Prize.	.90	1.00 1.20	1.25 1.10	1.15 1.10 1.15
Gold & Copper.	.30	.30	.30	.30 .30 .30
Hale & Norcross.	4.75	5.15 4.85	5.15 4.60	4.95 4.75 5.00
Holmes.	2.50	2.50	2.50	2.50 2.50 2.50
Independence.	.35	.35	.35	.35 .35 .35
Iowa.	.90	1.00	.95	1.00 1.25 1.50
Julia.	.50	.50	.50	.50 .50 .50
Justice.	1.30	1.50 1.25	1.30 1.20	1.50 1.30 1.70
Kentuck.	1.50	1.25 1.50	1.00	.85 1.05
Lady Wash.	.53	.65 .50	.60 .60	1.00 .85 1.05
Martin White.	2.00	2.00	2.00	2.00 2.00 2.00
Mono.	4.00	4.00	4.00	4.00 4.00 4.00
Mexican.	4.60	4.95 4.65	5.15 4.60	5.25 4.90 7.25
MT. Diablo.	3.90	4.25 4.20	4.25	—
Northern Belle.	1.00	1.00	1.00	1.00 1.00 1.00
Navajo.	1.30	1.20	1.25 1.20	1.25 1.25 1.40
North Bull.	1.00	1.00	1.00	1.00 1.00 1.00
Niagara.	1.00	1.00	1.00	1.00 1.00 1.00
Nev. Queen.	3.05	3.30 3.30	3.75 3.20	3.75 3.20 3.95
North G. & C.	.50	.50	.50	.50 .50 .50
Ophir.	3.00	3.00	3.00	3.00 3.00 3.00
Occidental.	.75	.75	.75	.75 .75 .75
Overman.	1.50	1.85	1.65 1.50	1.80 1.80 2.50
Potosi.	.75	.85 1.00	1.00 1.00	.75 .50 1.00
Peerless.	.60	.65 .55	.60 .55	.60 .60 .65
Peer.	.35	.45	.35	.40 .40 .65
P. Sheridan.	.45	.45	.45	.45 .45 .45
Silver Star.	5.25	.65 .50	5.75 5.25	.65 .50 7.50
Savage.	.60	.60	.60	.60 .60 .60
Seg. Belcher.	3.10	3.75 3.40	3.70 3.65	3.70 3.65 6.50
Sierra Nevada.	.35	.35	.35	.35 .35 .35
Silver Hill.	.85	.85	.85	.85 .85 .85
Silver King.	.30	.30	.30	.30 .30 .30
Scorpion.	.65	.75 .65	.70 .65	.80 .70 1.15
Syndicate.	.20	.20	.20	.20 .20 .20
Union Con.	2.30	3.15 2.50	3.10 3.00	3.40 3.40 5.25
Utah.	1.90	1.20 1.00	1.10 1.05	1.65 1.45 3.00
Yellow Jacket.	4.90	5.15 4.50	5.15 4.85	5.00 4.95 6.25

Sales at San Francisco Stock Exchange.

THURSDAY May 19, 1887.	710	Gould & Curry.	5 @ 5 1/2
1250 Alta.	3.75 @ 3.85	580 Hale & Nor.	—
1255 Andes.	2.00 @ 2.10	900 Iowa.	—
200 Atlantic.	50 @ 52	500 Justice.	1.50 @ 1.55
200 Alpha.	3.75 @ 3.85	600 Julia.	—
800 Argenta.	2.50 @ 2.60	500 Lady Wash.	95c
400 B. & Belcher.	7.00 @ 7.10	520 Mexican.	—
50 Bullion.	2.00 @ 2.10	500 Mono.	4.00 @ 4.10
625 Benton.	2.75 @ 2.85	50 N. Belle Is.	9.50
250 Belcher.	4.25 @ 4.35	300 Nev. Queen.	3.95
150 Baltimore.	1.00 @ 1.10	850 Ophir.	1.00 @ 1.10
100 Belle Isle.	80 @ 85	1150 Overman.	2.05 @ 2.25
150 Bulwer.	.30 @ .35	485 Potosi.	—
400 Bodie Con.	2.95 @ 3.00	300 P. Sheridan.	20c
450 Chollar.	.75 @ .80	100 Peerless.	70c
1250 Con. Va. & Cal.	1.80 @ 1.90	200 Silver Hill.	60c
150 Crocker.	3.15 @ 3.25	300 Scorpion.	3.40 @ 3.50
10 Confidence.	.60 @ .65	300 Savage.	60c
200 Crocker.	.85 @ .90	700 Sierra Nevada.	5 @ 5 1/2
300 Central.	.60 @ .65	100 Syndicate.	25c
100 Con. Imperial.	2.00 @ 2.10	150 Union Con.	4.20 @ 4.40
200 Caledonia.	75c @ .80	1000 Utah.	2.00 @ 2.10
450 Exchequer.	1.75 @ 1.85	150 Yellow Jacket.	5 @ 5 1/2

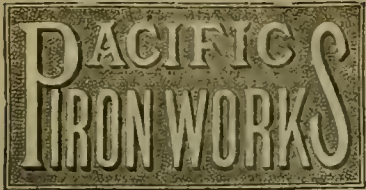
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A BOOK YOU ALL WANT.

Lefel's Construction of Mill Dams and Bookwalter's Millwright and Mechanic.

A STANDARD WORK.

This practical work of 233 pages gives with full illustrations and complete details how to build or repair all kinds of mill dams. Plans have been taken to thoroughly illustrate dam construction and rudimentary hydraulics. It contains fine cuts of all the well-known dams now



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 BUILDERS OF...
MINING MACHINERY.

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PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

RAE'S ELECTRIC SYSTEM OF METALLURGY,

Fully Covered by Patents.

THE MOST IMPORTANT DISCOVERY OF MODERN TIMES RELATING TO THE REDUCTION OF ORES.

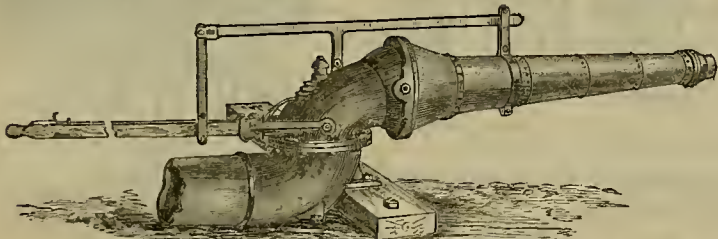
EFFECTS A SAVING OF OVER 50 PER CENT IN QUICKSILVER, AND LARGELY INCREASES BULLION PRODUCT. CAN BE APPLIED TO THE MACHINERY ORDINARILY USED IN MILLS, AT COMPARATIVELY SMALL EXPENSE, AND WITH BUT LITTLE CHANGE.

FOR FURTHER PARTICULARS APPLY TO OR ADDRESS

PACIFIC IRON WORKS, San Francisco, Cal.



IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,
 39 to 51 Fremont St., San Francisco, Cal.

CALIFORNIA VIGORIT POWDER CO.,

No. 40 California Street, San Francisco,

—MANUFACTURERS OF—

NITRO-GLYCERINE

("DYNAMITE" or "GIANT")

Blasting Powders.

Vigorit "LOW" Powder,

FOR REMOVING STUMPS AND TREES, HAS NO EQUAL.

WORKS: California City, Marin Co., Cal.

ED. G. LUKENS, Manager.

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MADE ENTIRELY OF BAR STEEL. Six Sizes; adapted for Pipe from 1/2 to 14 inches diameter.

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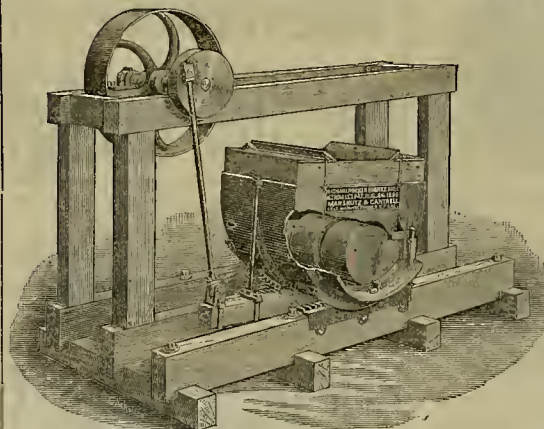
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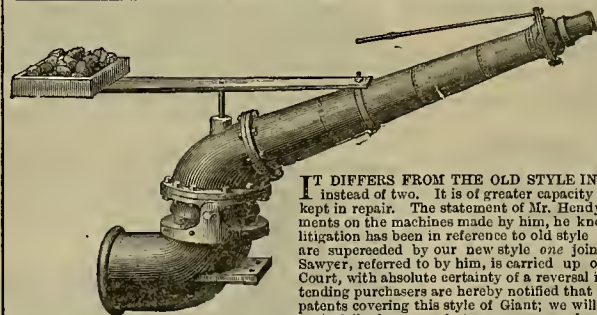
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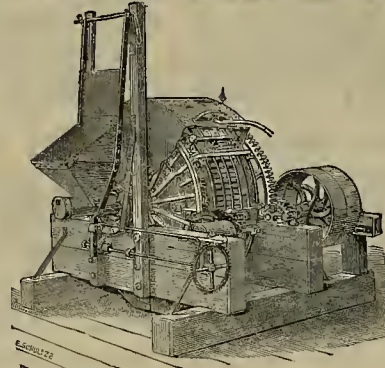
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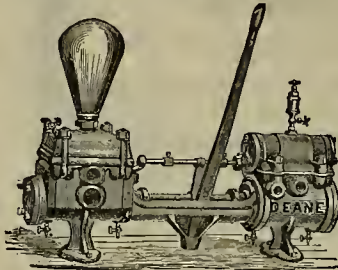
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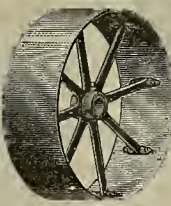
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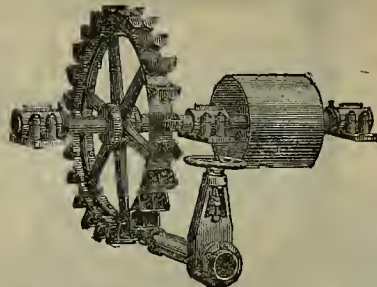
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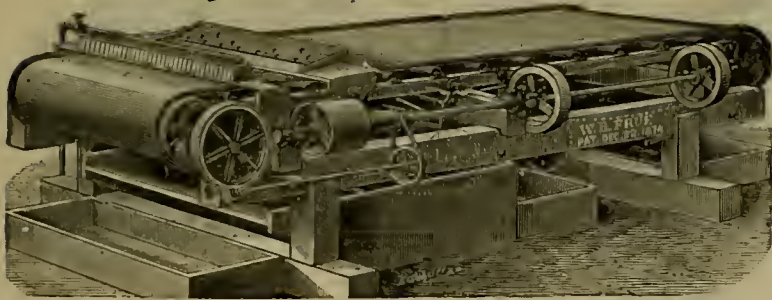
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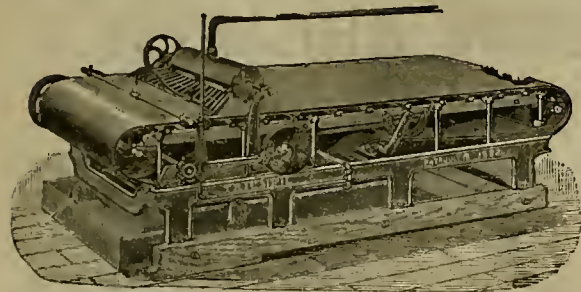
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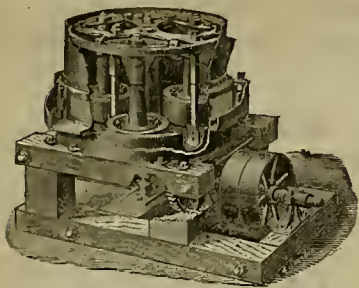
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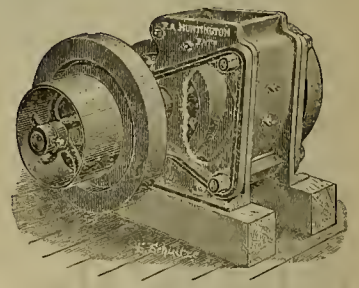


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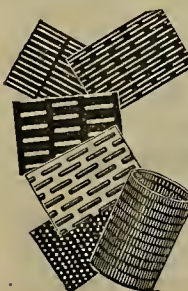
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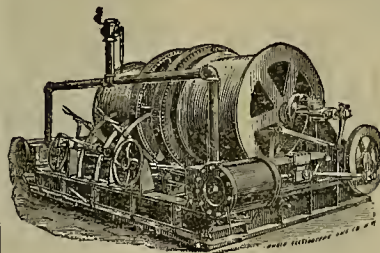


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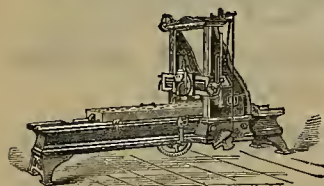
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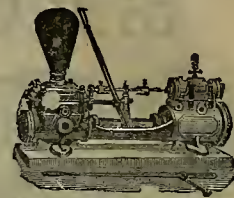


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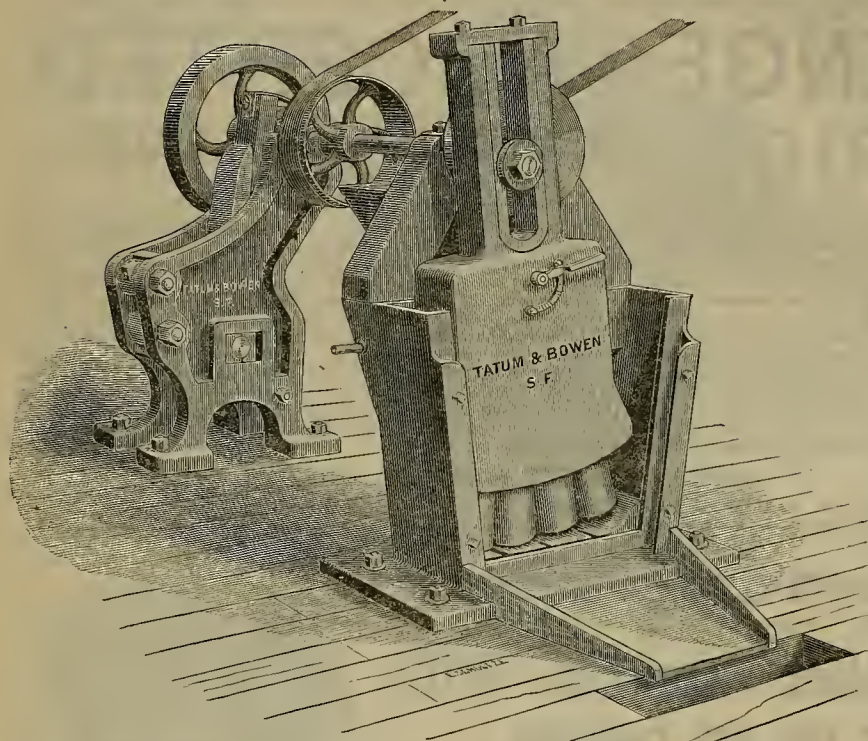
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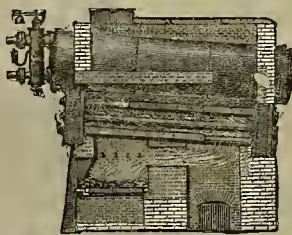
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The Cogswell Polytechnic College.

A New Technical School for San Francisco.

A few weeks since we chronicled the fact that Dr. Henry D. Cogswell, of this city, had donated property worth \$1,000,000 to found a technical school where our boys and girls may prepare themselves for the trades and vocations of life. On this page we give the elevation of the main building of this new institute of learning, the plans of which were drawn by Chas. Geddes, the architect. The structure will be of pressed brick with stone trimmings. It is to be located on the lot corner of Folsom and Twenty-sixth streets, with a frontage of 245 feet on the first-named street and 182 feet on the latter.

The building will be three stories high, and from its imposing and substantial appearance will be the most notable structure in the southwestern portion of the city. It will be 71 feet in width by 85 feet in depth, not including the projections. On each side will be a wing two stories in height, each 35x40 feet. The building will be surmounted with a high roof, covered with ornamental metal Queen Anne shingles and have handsome cresting on the ridges. In front a high tower rises to the height of 127 feet, the apex topped with a revolving crystal star set in a copper pinnacle. On the face of the tower, above the third-story line, will be the dial of a clock, and still lower down will be the name of the school. The main entrance is spacious and surrounded with a wide porch. On each side of the door is a niche for the placing of pieces of statuary. There are also two side entrances—one for boys and the other for girls. The main-entrance porch is approached by a broad flight of stone steps. The main hallway is ten feet wide, and opens into a cross-hallway 12 feet wide, which crosses the building from end to end. From the cross-hall, stairways lead to the second story; stairs also lead to the stage at the rear and to the front of the assembly hall, in the story above. It will thus be seen that the means of egress are unusually excellent, there being three wide doorways from the ground story to the street and two from the second story to the assembly hall.

There are to be 10 classrooms, each 28x30 feet, four to be on the main floor and the other six to be in the second story. On the first floor

also will be the offices of the president and secretary, a reception parlor, a library 16x28 feet, and a museum 20x28 feet, besides a number of dressing and toilet-rooms. A spacious assembly hall occupies the entire third story. It is 68x70 feet in size and will have a seating capacity for 1000. It will be used for the delivery of scientific and other lectures in connection with the regular courses of study in the school. This hall is to be handsomely furnished and provided with a stage with all the necessary adjuncts for completeness. All the rooms are

with iron lathes, a drill-press, planers and rollers, by the aid of which pupils will be instructed in the arts of turning, drilling, and planing iron, so that they will be qualified to construct tools and small pieces of machinery. A forging furnace and laboratory will also be established and occupy a space 40x40 feet. The founding laboratory will be 35x40 feet in size, and contain a furnace and other necessary appliances.

The second floor will be devoted to the chemical, wood and physical departments. The carpentry department will be 40x35 feet, and be

the basement will be well-lighted lunchrooms for the boys and girls; also rooms for the janitors and others who will reside permanently on the premises. There is also some additional space which may be utilized for classrooms or shops that may hereafter be required or found desirable. All the departments of machinery will receive motive power from a 75-horse power horizontal engine, which, together with the boilers, will be of the most approved pattern.

In connection with the instruction in the mechanical arts and sciences, a four years' course

of instruction will be given to those pupils who may so desire. The course will include a thorough English education, together with German, Spanish and French. Arithmetic, geometry and algebra will be embraced in the English course, and special attention given to all branches that may in any manner be deemed essential to the many mechanical pursuits. A course will also be given in mechanical and architectural drawing, embracing both freehand and perspective. Business forms, single and double entry bookkeeping, telegraphy, phonography, commercial law and correspondence will also receive special attention. A notable feature of the college will be its recognition of the coming education for the preparation of progressive teachers.

The school will be open to the boys and girls of this city and State who may have completed the third grammar grade in the public schools. Tuition will be absolutely free, the endowment of the college being

of East and visit institutions of a similar nature, study the methods of work, and ascertain just what will be needed in the shape of machinery and scientific appliances to make the school all that it should be, and all that its generous and thoughtful founder wishes to make it.

The cost of the buildings alone will be some \$35,000, and the machinery and tools \$25,000 or \$30,000 more. The school will be under the personal management of James G. Kennedy as president and Mrs. M. E. Arnold vice-president, who have already been engaged to fill those two important positions. Mr. Kennedy supervised all the plans of the building and many details were suggested by him. As soon as the construction of the building is fairly under fully provided for by the donation of its generous founder.



THE COGSWELL POLYTECHNIC COLLEGE, SAN FRANCISCO.

well lighted, and every appliance known to modern skill will be introduced to make ventilation perfect. They are to be lighted with electricity, and electric bells and speaking-tubes will be run throughout the structure.

A short distance in the rear of the main edifice will be another building in which the shops and laboratories are to be fitted up. It will face to the north and be 152 feet in length by 40 feet wide, and two stories in height. The ground floor will be devoted exclusively to iron work, both designing and molding, having departments for filing, fitting and chipping. A laboratory will be established in a room 35x40 feet, and fitted with all the essentials for thorough instruction in polishing, fitting and setting up of various pieces and descriptions of machinery. A machine-tool laboratory will be 40x40 feet in size, and completely equipped

supplied with an extensive assortment of tools. A wood-turning factory will be 40x40 feet, and be supplied with lathes, a planer, a circular-saw, a handsaw, a mortise machine, a molder and several other machines. The remaining space on the floor will be at the disposal of the physical and chemical departments. One room, 20x20 feet in size, will be fitted up with shelving inclosed in a glass front, where all the philosophical apparatus will be kept that is used in experiments in chemistry and physical instruction. The furnaces in connection with this department will be in an adjoining room, 40x50 feet in size.

The department for the instruction of girls will be fully as complete in detail as that for the boys. Here instruction will be given in wood and metal carving, sewing, cutting and fitting, as well as other mechanical studies. In

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Geological Formations.

EDITORS PRESS:—I read with much interest the letter of your correspondent, which appeared in the edition of May 14th, under the head of "Some Remarks on Geological Theories." I do not wish to enter into any "heated discussion" over the matter, but it occurs to me that your correspondent either does not understand or intentionally distorts the teachings of modern geology. He makes several statements which he claims are from geologists or from geological text-books of the present day—the same thing—which statements I doubt he can show in any standard text-book. He says: "Granite is an igneous production—first formed of all the rock—the backbone of the earth. Furthermore, there have been deposited on the granite everywhere a uniform system of aqueous formations (sedimentary, he means) numerous, distinct and identifiable, amounting in the aggregate to an average thickness of about ten miles; therefore, when in any particular region the upper portion of the series, according to their classification, is wanting, in order to maintain their principles, they resort to the expedient of assuming that the missing portions have been removed by denudation."

I am not a professional geologist, but have studied it a little, and must say I never saw any such statements as the above in print before. If such theories are advanced they are certainly not from recognized authority.

In the first place, whether or not granite is a primitive formation underlying all other rocks, I do not know, though such, I believe, is assumed to be the case; but I do know that the lower series of Silurian rocks—the Cambrian overlies unconformably large areas of Archean rocks—not granitic at all, but metamorphic. In the Black Hills of Dakota, the Archean rocks have an enormous thickness, more than 25 miles being exposed, and in no case can the strata be found repeated by folding.

Furthermore, no geologist of any note assumes that there has been deposited everywhere sedimentary formations aggregating a thickness of 10 miles.

It is a well-known fact that the sedimentary formations—particularly the lower members, say from the Cambro-Silurian to the Permian in the United States—thin out coming westward from the Atlantic States to the Rocky mountains. The Devonian, for instance, which has a large development in the State of Pennsylvania, in Iowa is represented by a stratum of 150 feet, while in Dakota and Wyoming it is missing entirely. Is it reasonable or possible that this difference has been caused by denudation?

I think that while it may be possible, it is far from probable, but that the reason is that the land along the base of the Rockies at the time of the Devonian period was not submerged at all, and that the land was continually rising, and as a matter of course this would result in a thinning out of the strata in the States of the Mississippi valley and westward.

Another most convincing proof that at certain geological periods the entire earth's surface was not submerged is the beds of conglomerate which mark the shore lines, showing that the land beyond was an island or a continent in the sea.

As to the determination of the geological age of a rock by the fossils it contains, I think it needless to say anything about it. It is a generally accepted fact the world over, among all geologists. It remains for those who have no faith in it to disprove it.

As to what Darwin says concerning the large denuded (?) granitic area in South America, it must be remembered that at the time Darwin wrote, geology had not reached its present high standing. Personally, I know nothing of the area referred to, but I believe that the rocks are metamorphic and not igneous.

If they are metamorphic they are simply changed sedimentary strata, possibly Archean, perhaps later rocks, and even if they are igneous granite such a denudation may have taken place. The Colorado river in the Grand canyon in Arizona has cut its way down through 10,000 feet of sedimentary strata, and into the crystalline rocks below.

Your correspondent speaks in wonder at finding in temperate latitudes in the quaternary formation the fossil remains of animals from the tropics and the polar regions, and declares that if the denudation of the mountains was caused by immense masses of ice, it would have crushed the fossils to powder.

Rocks, soil, sand and fossils may have been, and doubtless were, transported thousands of miles on ice floes.

I cannot concede that it must have been necessary to submerge the entire earth's surface during the glacial or drift period to have produced the drift.

The internal dynamic forces which have produced the great mountain masses of the earth have been something tremendous, almost beyond the comprehension of man.

It does not seem to me at all improbable that the "see-sawing" actually took place.

W. H. STORMS.

South Pasadena, May 20th.

On Selling Mines.

EDITORS PRESS:—In the PRESS of April 30th is an article entitled "Bad Policy as well as Bad Morality," complaining of the miners in general exaggerating the amount of work done on their claims, picking out the best ore to get big assays from, claiming larger bodies in sight than they can show, etc. All this we are willing to acknowledge, and I humbly suggest as a way out of all the difficulties that usually surround the purchase and sale of a mine, that the miner in the first place stick to the unvarnished truth; that the capitalists hire a reliable, intelligent miner who knows what a good mine looks like, who is not afraid of work and has worked in mines, and can sharpen a pick or drill or put in a set of timbers, and can run a mine and keep a crew of miners at work so as to bring profit to his employer. If after such a man has looked at a mine, he thinks it is to your interest to take hold of the claim, then say to the mine-owner, "You give me a working-bond on your claim at such a price as is agreed upon and I will sink so many feet and drift so much. Then I will take a carload of the ore and have it worked at a good mill by reliable parties who understand their business and can and will give a fair and just return. Then if the ore will pay I will give you the price agreed upon in our bond. If it will not pay, then the mine is yours, with all the improvements made, to do with as you like." This would be fair on both sides. If the miner has a claim that will not pay, he wants to know it, and the sooner the better for him; and the capitalist wants to know, before he goes into the expense of putting up mills, etc., whether he has got a mine, whether there is wood and water—in short, count the cost and find out what the net profit will be. Then there will be success, and we will have no more big graveyards reminding us of our folly and giving the entire country a black eye. Above all things, Mr. Capitalist, do not put yourself into the hands of a white-handed expert who will sell you out to the unprincipled salter of claims, or who, if he cannot get the mine-owner to agree to pay him from \$3000 to \$10,000 in case he works up a sale, will report adversely and work off a worthless claim upon you.

Walker, A. T.

The Pine Creek Mines.

EDITORS PRESS:—This camp is about two years old. The first excitement began about this season of the year. This district is on the headwaters of Pine creek, a tributary of the Snake river, and is in Union county, Oregon, and about 60 miles in an easterly direction from Baker City. We have an abundance of snow here. The snowfall, since it began last fall to the present time, measured between 34 and 35 feet. We have two feet yet on the ground. Business is very dull, but we look for lively times in the near future. The Whitman mine, owned by the Oregon Gold Mining Company of Louisville, Ky., has the deepest works in the camp, their shaft being down over 300 feet, with a four-foot ledge in the bottom that is all good ore. The company has bought a mill of 20-stamp capacity, and will build as soon as the roads get in condition to haul heavy freight. They have a small force of men at work grading their mill-site.

We have several locations here that prospect very well. The Red Jacket claim, owned by Messrs. Duffey, Burdett & Tice, has showed itself to be remarkably rich. They shipped one carload of ore last fall that netted them over \$1000. There are also the Red Boy, Union, Robert Emmet, Last Chance, Companion, Cox and Allen, Forest Queen, Mayflower, and many others too numerous to mention. All these prospect well. The fact is, all this camp wants to make it one of the best on the coast is redaction works. Some good custom-mills would make things lively here winter and summer. Living is cheap, as we are close to a rich farming country. Timber for mining and building is plentiful. There is everything to make a good camp here except the redaction works.

Cornucopia, Oregon, May 15. S. K. S.

Exaggeration of Mines.

EDITORS PRESS:—Your recent article on exaggeration of mines by their owners is certainly timely.

Last January, after a ride of 60 miles over the desert, with men, tools and provisions (in your State), we found nothing whatever to justify the statements of a mine-owner and mining engineer(?). After a loss of about three weeks' time, and an expenditure of about \$500, we found out what could as well have been told us at once.

The Eastern party left, thoroughly disgusted with California mining, thinking he would be swindled by some one if he kept on. The one examining is also sure to think that whoever will lie this way would not stop at that, but if assays run high is afraid it is salted. Such a course is a great injury to your mining interests, as this party would have invested largely with a half decent treatment.

Elkhorn, M. T.

R. T. WOLSTON.

Southern California.

[Editorial Correspondence.]

There is no mistaking the fact that California, as an entire State, is just entering upon a new departure in its development and growth. Our agricultural productions have gone far up beyond the hundred millions, and more than quintupled the output of gold and silver. But until quite recently wheat has formed almost the only product of the field which has attracted much attention abroad.

In process of time, however, the wheat market became more or less demoralized. Competition from India and South America began to be feared and felt. There was a noted falling off in the acreage yield. Extensive fields, costly machinery and large capital were required to reach success. Many farmers of small means were compelled, year after year, to mortgage their crops in advance to provide a living for their families and seed and cultivation for their fields. Dry seasons were sure to come once in three or four years, and all the little gains of the intervening years were swept away by a single year of drouth. Then again the large holdings of land-owners, their disinclination to divide up their holdings into small farms such as might be within the reach of newcomers with small means, and other untoward circumstances, had a tendency to discourage immigration. As a sequence, agriculture followed the course of mining, and in turn failed to draw.

A New Industrial Era.

But American energy can never be kept down so long as there is coal or water to turn a wheel, or an acre of ground untilld. California had practically reached and passed its climax in the production of precious metals and wheat, and there was need that some new and more profitable branch of industry should be sought out to give employment to idle hands already here and operate as an inducement for the tide of immigration to once more set in this direction. A few far-seeing people had in the meantime been giving their attention to fruit-growing as a more profitable pursuit than wheat-raising. Fine peaches and pears, apricots and plums, etc., began to make their appearance in the market in greater profusion than before, and, above all, the vinticulturists began to make a fine showing of both fruit and wine. While this branch of fruit-growing was gradually being developed in the northern and central portions of the State, new life was also infused into the hitherto slow-going population of Southern California, in the line of producing citrus fruits. It was soon found that Southern California was capable of producing the finest oranges, lemons and olives in the world. Hundreds of thousands of orange trees were planted and the home market was soon overstocked.

Just at this time the overland railroad came to the assistance of the fruit-grower, and special rates were established under which fruits of every kind could be placed upon the Eastern market at a profit to the grower. A new and vast field of enterprise and industry now dawned upon California, which in time will far eclipse the product of the precious metals and wheat combined. It is mainly to this new feature in our industries that the California of to-day owes the boom which is now sweeping over the entire State from north to south, and which has created an excitement and feverish desire for emigration thither from the East, such as has not been seen before since the great gold excitement of '49 and '50. There is now a general waking up all over California. The press is everywhere writing up the special advantages of their several localities, and the people are talking. Immigrants and visitors are pouring into the State by thousands. Our hotels are full and often to overflowing. More hotels have been built or have been put in progress of construction the past year than during any previous three years, and still there is call for more. All this means immense gains in prosperity, wealth, and population to the State. California seems to be fully alive to the great advantages of her position, and to the wealth of her resources. And yet, intelligent tourists from the East have repeatedly assured the writer, during the last few weeks, that we, as a people, do not even yet fully appreciate our opportunities, or realize the extent of the excitement which exists at the East in regard to the movement in this direction.

The City of Los Angeles.

This new influx into the Golden State made its first appearance at Los Angeles. It was there that the boom commenced, and probably no single locality in the State has been so much benefited. Nowhere else has there been such an advance in the price of land; nowhere else has there been such an increase in population or in growth of city or town. The population of Los Angeles in 1880 was about 10,000. Now in a little over seven years it has increased to over 40,000, and the increase is still going on as rapidly as at any previous time. How long this boom is to continue no one can tell. Certain it is, there is no present evidence of its cessation. There are many conditions that favor this rapid growth, all of which indicate permanent prosperity. Its railroad connections, already extensive, are being constantly augmented. One continental road has its terminus there, and a second makes it one of its

chief terminal points. Short lines of rails are being pushed out in every direction, to bring in the wealth and business of the surrounding valleys. It will soon be in direct communication with San Diego, by a line along the coast. The Government is spending vast sums of money to perfect one of its harbors—San Pedro; while private enterprise is equally active and energetic in actually creating another at Balboa. The constant rush and haste, the coming and going of trains and making them up at the Southern Pacific railway depot, is something quite remarkable, and gives evidence of the transaction of a large amount of business. There is constant and direct steamship connection between San Pedro, the principal port of Los Angeles, and the entire Pacific Coast, and it is confidently expected that steam communication will soon be established with other countries. One of the representative men of Los Angeles, Walter T. Maxwell, will leave for Europe June 4th, to purchase a steel steamer with a capacity of 1800 tons, to meet the growing demand of Los Angeles for coal. Although crude petroleum has supplanted coal in all manufactures and for all steam-making there, the coal trade of the section, mainly to supply the interior demand, has become so enormous that it cannot be handled with the present facilities. The new steamer will ply from Port Moody, B. C., to Southern California ports. Huge coal-bunkers will be erected at San Pedro, Port Ballona and San Diego. The draft of the steamer will be only 15 feet, which will save lighterage at San Pedro, and will drop coal at \$2 per ton here. After discharging coal here she will carry cargoes of fruit and other Southern California products to Port Moody for shipment over the Canadian Pacific.

The city has recently spread out enormously over all the surrounding country, a fact which has called into existence a most extensive system of street railways. Two cable roads are already in operation, and one electric motor, while ordinary one and two-horse cars are seen in every direction through the city and its environs. Probably no city in the Union, of its size, has such a thorough and well-equipped system of street railroads. In regard to

The Architectural Beauties of the City, And the rapid advance which it is making in everything which pertains to the permanent growth of a large city, we have neither time nor space to do the subject justice. That work speaks for itself. Every work of that character, either in progress or being projected, is of a substantial character and is being planned and carried out with the best architectural and engineering skill. The environs for miles in every direction around the city, and especially its picturesque heights, are being crowded with large and elegant residences and villas, which bespeak both the wealth and taste of the owners.

With the advancement of the city of Los Angeles, the suburban towns and the rural districts in every direction are marching onward in growth and prosperity. Already some of the whilom towns and villages are taking on the semblance of cities. The wave of Eastern immigration and tourist travel appears to be constantly on the increase, and we are assured by those now here that the excitement at the East in regard to California is constantly increasing, and will continue to increase into the indefinite future.

Institutions of Learning.

Los Angeles is fast becoming noted for its institutions of learning. A branch of the State Normal School was established here in 1881, by an appropriation of \$50,000, to which was added five acres of land, by the city, on a beautiful site worth fully \$20,000, to which \$10,000 have already been added in beautifying the grounds.

The University of Southern California, also located here, gives a full college course in all the leading departments of study, including law, medicine and theology. This university has four associate colleges, as follows: Chaffey College of Agriculture at Ontario; Maclay Theological Institute at San Fernando; College of Arts, Literature and Science, at Escondido, San Diego county; and one is to be established in the form of a technological and industrial school at Colton.

There is also a college for young ladies established here, under the supervision of Rev. D. W. Hanna, one of the most gifted and able persons who should have charge of such an institution. Their commencement exercises for the beginning of the term 1886-7 represented a higher order of attainment than is usual among this class of colleges. They have a new and enlarged building, with modern improvements in the class and lecture-rooms, dormitories, gymnasium, etc. An uncommon degree of success no doubt awaits the future of this institution.

The public schools of the county are under a most excellent management. The total number of children under 17, according to the school census of 1886, was 26,653. Total enrollment, 12,616. Total valuation of school property, \$545,509. There are 11 frame schoolhouses and 4 brick.

FREIGHT RATES AGREED UPON.—It was telegraphed from Chicago, Wednesday, that the following rates of freight were fixed: Wool, scoured—New York, \$2; Chicago, \$1.65; Missouri river, \$1.40; St. Louis, \$1.54. Hops, carload—Chicago, \$1.95; St. Louis, \$1.85; Missouri river, \$1.75. Barley—Chicago, 75c.; St. Louis, 72c.; Missouri river, 65c.

Prospectors.

The Pioneers of Western Civilization.

All over the great mineral West an army is in motion. Not an organized army governed by tactics, and marching with military precision toward a given point, but an irregular mass of humanity independent of any order, traveling in different directions as fancy guides them. From Old Mexico's sunny, vine-wreathed clime to the glacier-bound coast of Alaska, and far up the wonderful rivers of the Arctic slope, this army is moving. On the hot burning sands of Arizona's deserts, amid the snow-capped mountains of Colorado and Nevada, over the fertile fields of Montana and around the peaks of Idaho, these struggling, hardy pioneers of the coming civilization are going forth, penetrating the unbroken wilderness, examining the innumerable mountains and gulches, searching for the precious metals. We allude to that class of restless and adventurous beings called prospectors—a class that has done more to develop the resources of the West than the Government itself, or any expensive band of explorers ever sent out by it. Since that eventful day in 1848 when Marshall picked up the nugget in the tailrace of Sutter's mill in California until the present, prospecting has been an alluring occupation to many hundreds. Some join the ranks in hopes of sudden accessions to riches, many for the love of the wild, free, nomadic life such an occupation allows; some through failure in business at their old homes, others through unrequited affections. To recover their lost fortunes in the former instances, and to forget in the latter, causes many to try their luck on fortune's wheel, hoping that the blind old dame who manipulates it may give it a turn in their favor. At times fortune smiles on a grizzled prospector. In the language of the fraternity, "luck turns his way" and he suddenly acquires great wealth. These freaks of fortune in the few instances stimulate others to greater exertion, and encourage in them hopes of reaching the goal of their ambitions. The people who come into a mining country after it is well settled, traveling over well-graded roads in easy conveyances, little appreciate the trials and dangers the prospectors endured while pointing out the way to hidden wealth.

Too much credit cannot be given the hardy prospector who turns his back on civilization, takes his life in his hand, and risks everything for the purpose of unearthing the treasures that lie hidden far down in the bowels of the earth. Of course, his motive may in a measure be selfish, but he cannot or does not desire to prevent the coming millions from enjoying what his nerve and industry has brought to light.

Treat kindly the poor old prospector, for to him the people of the great West in a large measure owe their prosperity, and all should hold him in everlasting regard.—*Cœur d'Alene Record*.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DIRECT-ACTING ENGINE.—Joseph Pracy, S. F. No. 362,855. Dated May 10, 1887. This invention is more particularly applicable to that class of engines which are employed to operate pumps. It consists of a novel arrangement of a single valve with supply and exhaust ports and a mechanism by which the valve is operated.

FRUIT DRIER.—G. A. Fleming & C. F. Fleming, San Jose. No. 362,736. Dated May 10, 1887. This invention consists in various details of construction and arrangement relating to the heating of the air, its control and admission to the fruit chambers, the management and disposal of the fruit trays, the natural and artificial draft and other features,

In the Yosemite.

The flight of the seasons brings us again to the time for planning excursions to the Yosemite. It will probably be a year of unusual activity in the valley, for it will be only fair that our greatest gorge should share in the general boom. It may be commended as one corner of the State in which the real estate man has nothing to sell, but we do not know that that will commend it much, for our visitors seem rather to enjoy the real estate activity which now prevails.

We give on this page a view of four of the gems of the Yosemite, the engraving being reproduced from Major Truman's work, "From

"In a Mining Kitchen," by "I. H. B.," is an interesting sketch of pioneer days; "Pintacooset Colony" and "Chata and Chinla" are continued; short stories, sketches, poems, reviews and a supplement upon Albuquerque and the region tributary thereto complete the number.

Forests and Rainfall.

The tangle of decayed vegetation which covers the ground beneath the forest is of considerable thickness. On top it consists altogether of the decayed trunks, branches, and leaves, but it shades down into ordinary dark-colored soil at the depth of a few feet from the surface. This, the decay zone of the forest, lies between the

water-supply is the sea, which sends into the lands a tolerably regular annual store of moisture. When this falls as rain or snow, either of two things may happen—the water may go away directly to the sea, or it may return to the atmosphere as vapor to be again precipitated as rain. The chance of its re-evaporation is determined by the speed with which it flows to the streams. From a treeless region it rapidly escapes; in an extensive district of virgin forest it may again and again pass from earth to air, and from air to earth.

The columns of vapor, which in times of summer rain may be seen ascending from every great wood, afford visible evidence of the effect of forests on rainfall. They also may show the observer some of the most beautiful phenomena of atmospheric circulation. In a summer rain-shower the air above the trees becomes much cooler than it is in the recesses below their tents of foliage. This heated air within the wood seeks to rise, and escapes in great columns wherever there is a wide gap between the branches. As soon as it attains the cooler level above, the moisture is condensed, and the air, before transparent, becomes charged with steam. To replace this ascending air, a broad current drifts toward the emerging streams of vapor, commonly from the higher parts of the forest, where the air, owing to the elevation of the site, is cooler than in the lower levels.

This repeated passage of the moisture from earth to cloud, and from cloud to earth, greatly increases the amount of force which the rain applies in its falling drops to the earth's surface; but the rank vegetation protects the surface from the erosion which it would otherwise bring about. Even the forest-clad hillsides of the Cumberland mountains, where the soil lies on declivities of great steepness, suffer little wear as long as their natural protection is left to them. But as soon as they are stripped of the garment of wood which has been upon the region ever since, in the far-off ages, they came from the depths of the sea, they wear with great rapidity. The erosion is limited as long as they are forest-clad to the stream beds, and there is hindered by the innumerable obstacles of the fallen trees and entangled driftwood. The brooks which are strong enough to clear their beds and cut into the earth and rock, are few in number; we may often, on the flatter ground, find tracts of a square mile or more in area in which there is not a single stream that ever assails the surface of the earth. As soon, however, as the forest mat is removed, the surface becomes seamed with channels; they often, on the deforested surface, increase one hundred-fold in their length, and more than that measure in their destructive power. Relieved of all restraint from fallen timber, or the close-knit roots which enmesh the earth, they sweep the precious soil away toward the sea. In a single day a tilled field may lose from its surface more soil than would be taken from it in a century of its forest state.—PROF. N. S. SHALER, in *Scribner's Magazine*.

Domestic Animals of the World.

The *Scottish Agriculture Gazette* has made a conspectus of the live-stock of the world. From this it is found that there are in round numbers 92,000,000 head of cattle, 36,000,000 horses, 200,000,000 sheep and 46,000,000 swine in Europe.

In figuring on the collective live-stock of the several nations, it is found that Russia has the largest number of animals of every class. Inclusive of Poland and Finland, this Empire has no less than 25,000,000 head of cattle, 45,000,000 head of sheep, 10,000,000 swine and 17,000,000 horses. Sheep have increased 20 per cent in 20 years, and horned cattle and swine 4 per cent.

Next to Russia, Germany has the greatest number of cattle—about 15,000,000 head—but Germany has barely 25,000,000 sheep, 7,000,000 swine and only 3,000,000 horses. Austria-Hungary ranks third with 12,000,000 horned cattle, 7,000,000 swine and about 3,000,000 horses, but sixth on the list with regard to sheep, having only 20,000,000 head.

Austria stands next to France in cattle, having 11,000,000 head, but takes the fourth place in sheep and swine, having 24,000,000 of the first and 5,000,000 of the latter. Austria has 3,000,000 horses, and in this compare about with France and Servia combined.

Great Britain has but 9,000,000 cattle, but next to Russia, most populous in sheep, having 32,000,000 head. She stands fifth in the list of horses, having 2,005,000 head, and with 2,225,000 swine is sixth in the list. The census of live-stock in Great Britain has been reduced during the last six years by over 500,000 cattle, 750,000 hogs and 4,000,000 sheep.

Of countries outside of Europe, the United States has 45,510,000 cattle, 48,322,000 sheep, 12,077,000 horses and 42,092,000 swine. The La Plata States of South America, 19,500,000 head of cattle, 70,000,000 sheep and 500,000 swine. To these must be added 30,000,000 cattle found on the pampas-grass plains.

BIG DAMS.—Among the largest dams in the world for the purpose of storing water for mining purposes are the dams in Nevada. One is 425 feet long and 100 feet high; another is 576 feet long and 75 feet high.

An English inventor claims that bells made by soldering together pieces of bent metal give a much better volume of sound than cast bells.



VIEWS OF THE YOSEMITE, FROM RECENT PHOTOGRAPHS BY TABER.

the Crescent City to the Golden Gate." The engraving is from recent photographs by Taber, and will, we believe, be regarded by our readers as one of the handsomest of the many views of the valley which have appeared in our columns. The falls shown have been frequently described, and it will suffice now merely to give the height from which their water is poured into the valley: Bridal Veil, 900 feet; Vernal, 400 feet; Nevada, 600 feet. These are among the most beautiful falls of the valley, though the Yosemite surpasses them greatly in descent as it leaps 2526 feet from the crown of the ledge to the valley.

THE "OVERLAND" FOR MAY.—The *Overland Monthly* for May contains articles upon "The Mission of the Knights of Labor," by Irving M. Scott, treating of the various phases of the labor movement; "Causes of the Piute and Bannock War," by Maj.-Gen. O. O. Howard—the first of a series of Indian war papers; "The Mineral Resources of Southern California," by Henry De Groot, a treatise of the mines and mining interests of the southern half of the State; "Grandma Bascom's Story of San Jose in '49," by M. H. Field, a vivid and picturesque sketch of early times in the Santa Clara valley; "Agriculture along the Rio Grande," by O. E. Cronwell, an interesting article upon the capabilities of the central New Mexican valley.

houghs of the air and the branches of the roots. In it go on the most important actions which take place in our forests—actions which affect the history of land and sea. We shall therefore have to consider it in a somewhat painstaking way. The most evident effect of this sheet of decaying wood, and moss which feeds on the decay, is on the rainfall of the region which it mantles. When, after a season of drought, a copious rain falls upon this spongy mass, the water is for a long time absorbed in the interstices and does not flow to the river. Even in times of very heavy rain the water is slowly yielded to the streams; after a dry period of many weeks this sponge retains a good share of water. A like amount of rain falling on tilled fields or prairies slips quickly away to the rivers, and thence to the sea. The first result is, that when the land is destitute of forests it sheds water like house-roofs, breeding floods after every considerable rain, while in the forests the rain is only slowly yielded to the streams.

A second and less evident result of the spongy character of the forest-bed is that, by hindering the escape of the rain-water to the rivers, it increases the actual rainfall of the country. To see the nature and importance of this action, we must turn aside for a moment to consider the origin of the rain which falls upon the land. The original source of this



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G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, May 28, 1887.

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Passing Events.

The discovery of a large quartz ledge on another of the islands of Alaska will direct renewed attention to the mining interests of that Territory, which even now are prosperous when the small amount of work done is considered. The ledges up there are phenomenally large.

The abundant supply of snow in the mountain regions of California will give a good water season, and be of great benefit to the gulch and ravine miners, though this is not now of so much importance to the State as when the hydraulic mines were allowed to work.

Immigration to this State still continues large, and the vacant lands are rapidly settling up. The advance in price of land in the more populous portion of the State is bringing the larger tracts into the market to the great advantage of many sections.

The use of water-power for driving machinery in the quartz mines is increasing, and wherever practicable it is being adopted. This is one of the means by which the cost of working ore is decreased.

DR. ALFRED RUSSELL WALLACE, the famous English savant, lectured on the Darwinian theory of evolution on Wednesday and Friday evenings at Pioneer hall, before a select and cultured audience. He was introduced by Prof. Joseph Le Conte, of the University of California, who briefly alluded to evolution as the greatest idea of modern times. Dr. Wallace's lecture was a scholarly effort highly appreciated by his hearers.

An Aid to Mining Interests.

The area on this coast within which mines are being worked has largely increased of late years. For a long time most of the mines operated were in California, Nevada, Montana and Utah. Very little was done in Arizona, and Idaho was only partly prospected. Even in Montana the camps which are now the principal ones were not known a dozen years ago. Idaho has new and prosperous camps in the Wood river and Cœur d'Alene countries. Montana has developed wonderfully in the past few years. Arizona has got rid of its Indian iconuh, and is developing its mining fields. New Mexico is opening up new areas. Oregon is doing better than it has ever done before. Alaska has come into the list of bullion-producers, and the way it is showing up on big ledges is somewhat surprising. Nevada alone has retrograded, mainly owing to the failure of the bonanza of the Comstock lode. The miners even there are working away, however, and do not seem discouraged at their poor luck. They are taking measures to work their low-grade ore, and when they are able to do that at a good profit will take on their old-time prosperity. Washington Territory with little gold or silver has steady profit from its coal mines which are largely increasing their product.

During all these years the MINING AND SCIENTIFIC PRESS has been mainly devoted to these mining interests. It has seen the growth of the various camps and watched their progress. It has recorded the current mining news from week to week—the strikes, developments, etc. It has gathered information for the use of the miners of the coast on all topics which would benefit or interest them. It has often illustrated, at much expense, and described the improvements in mining appliances and metallurgical processes, and sent its representatives to the mines in all the Coast States and Territories in quest of information which would be of use to its readers.

The PRESS fills a different field from that of the local paper. No camp can well do without its home journal, of course, and a good newspaper in a mining town should largely devote itself to mining affairs. But the PRESS is not local in its character. It aims to collect information of a practical nature which will be of benefit to the miner or metallurgist wherever he may be. The current mining news is compiled and condensed in a special department, covering a wide field, to be sure, but so arranged as to be easy of reference. But the descriptions of processes, appliances, machinery, etc., are scarcely within the province of a local paper, which is not generally in a position to illustrate by means of engravings.

The MINING AND SCIENTIFIC PRESS is the oldest mining paper or periodical published in the United States. Its editors and publishers have had many years' experience in industrial journalism, and understand the wants of their patrons. There are subscribers now on our lists whose names have been there for more than 20 years. Our correspondents are many, and their letters, coming as they do from so many quarters of the mining regions, are of great interest to the mining public. It is safe to say that millions of dollars have been saved to individual miners and operators, and much more added to the wealth of the Pacific States, by the intelligence disseminated through its columns during its successful career of over 27 years in its field of wonderful growth and development.

There are many who have taken up the business of mining of late who would be benefited by being subscribers to the PRESS. They will find it a conservative and truthful exponent of the mining industry, and from its columns they will obtain much practical information of all kinds. They can learn what others in the same business are doing, and hear of all the improvements in mining and milling as fast as they are developed. Those who are familiar with the PRESS will do well to call the attention of others to its merits.

Of all mining journals ever published in this or any other country, the PRESS has been most significant for the large proportion of practical mining information it has contained. The exchange of views of mine-workers and metallurgists of practical working ideas alone makes the paper worth many times its cost to the average miner and metallurgist. A single hint may be worth thousands of dollars.

Reaching the Goal of Wealth by the New Road of Economy.

The early stock of Californians, they who were attracted to the country by the glamour of the gold mines, came here in the hope of being able to acquire a speedy fortune. In their eagerness to accomplish that end, the mines not always rewarding them according to expectation, these Argonauts were tempted into all kinds of speculations, the majority of which, it is needless to say, proved failures. Meantime, the habits of the entire population were extravagant, nearly everybody spending to the full extent of their income or their earnings, which, as a general thing, were large so long as the mines continued to yield liberally. But at length the production of gold began to fall off, and with it came diminished wages and a devaluation of prices generally. But the speculative spirit and the spendthrift habits contracted during the flush times still remained, our people continuing their prodigality long after their ability to earn had been so seriously crippled. And so, year by year, they grew poorer and poorer, until sheer necessity compelled the observance of greater economy, a change that it took a full decade or more to bring about, so firmly had this disposition to squander become rooted among all classes. We wish we could say that it had even now become wholly eradicated. But so great is the improvement that has already been effected in the direction of greater economy and thrift, that we may be said to be a regenerated people. The changes that have been wrought in this respect are best seen by comparison. Twenty years ago the average Californian, in planning for a homestead, contemplated a grand establishment erected at a cost ranging anywhere from \$20,000 to \$100,000. Ten years ago the amount to be appropriated for such purpose had shrunk 50 per cent or more, and now the most of our people believe they could manage to get along with a much less costly residence even than this, the ambition of many not going beyond an outlay of \$1000 or so. Men there are, who, recalling how comfortable they were living in a log cabin in the mines, fancy now that a person might at least exist in a \$500 dwelling, some of these being, perhaps, persons who, in the high old times, would have scorned to think of inhabiting anything less than a \$20,000 mansion.

As with changed circumstances visions of palatial dwellings have vanished, so has the old-time banking after a corresponding grandeur in other respects been subdued or essentially modified, our inordinate desires having been in good measure subordinated to necessity and reason. The spacious grounds, with their artistic walks and costly exotics, have given place to the vegetable garden with the succulent potato and the pungent onion. The convenient horse-car has been largely substituted for the gilded phaeton, with its coat of arms and the prancing steed, while the nickel-plated watch fills the fob formerly occupied by the much jeweled time-keeper; and so on through the long category of our once multiplied wants and luxurious desires. As regards sumptuous living, costly equipage, fine apparel—in all our expenditures a willingness to retrench and save is noticeable, nor is it probable that we have yet quite reached bedrock in this direction. In certain respects further contraction might well be practiced. In the matter of *gush* this is absolutely called for. To impulsive squandering of money for little worthy objects and purposes many of our people are still too much addicted. To be accounted a lavish giver has been with Californians a consuming vanity, and one that sticks to some of them even in their impecuniosity.

But in having so far learned to save as well as to earn, our people are entering on a new career, and one that insures for them a grand and lasting prosperity. This was the one thing requisite to that end, our former spendthrift habits having gone a long way toward neutralizing our many natural advantages. As before we vainly hoped to grow rich by speculating, so are we now sure to reach that end by saving.

Two large consignments of Portland cement have arrived from London, purchased by the Pacific Improvement Company for work on the projected cable roads. The Earl Dalhousie brought 13,630 barrels and the British Isles 16,000.

Report of the Director of the Mint.

There are two sources from which the bullion product of the country is annually figured up. Wells, Fargo & Co., who handle most of the gold and silver, keep statistics, which are pretty generally recognized as reliable, and upon the basis of these figures, for many years past, the product of the various States and Territories is each year determined. The Director of the U. S. Mint also reports on this subject. The figures of the two authorities do not agree always. We gave, in our annual mining review in January, Wells, Fargo & Co.'s estimate. The Director of the Mint estimates the production of the United States in 1886 to have been: Gold, \$35,000,000; silver, \$51,000,000. The value of silver in the above estimate is calculated at the coining rate of silver in the United States silver dollar, namely, 1.2925 per ounce fine.

In the Mint report the production of gold shows an increase over prior years of \$32,000,000. The production of silver is slightly less than in 1885. The tabular statement shows that the production of silver in the United States has largely increased from 1880, when it was \$39,200,000, to \$51,000,000 in 1886. The production of gold in 1880 reached \$36,000,000, against \$35,000,000 in 1886. Colorado maintains the first rank as the largest producer of precious metals in the United States, the value of its production of gold and silver having been over \$20,000,000 during the last year. California takes second place to Montana with a production of nearly \$17,000,000, against \$16,000,000 by the former. The production of Nevada and New Mexico has decreased, while that of the other States has remained almost constant. Texas, for the first time, is added to the list of producers.

The annual supply of silver from the mines of the world has largely increased in the last four years, and the period is covered by a marked decline in the market price of silver. Since 1872 the coinage value of gold was \$31,400,000; silver, \$7,000,000; total, \$38,400,000. A total metallic stock on January 1, 1887, was, of gold, \$641,400,000; silver, \$331,800,000; total, \$973,200,000. The Director's figures go to show that of the stock of gold coin estimated to have been in the United States on the first of the present year, there was in the Treasury of the United States and in the National and State banks and in circulation on the Pacific Slope, \$360,000,000, leaving \$200,000,000 in the hands of the people and banks and savings institutions of the United States, east of the Sierra Nevada mountains (other than the national banks and 849 State banks which reported to the Controller of the Currency).

Coin or Certificates.

It is stated that the Treasury Department is considering a proposition to make efforts to substitute paper currency circulation for the present coin circulation of the Pacific Slope, and secure the return of gold coin to the Treasury as a means of strengthening its reserve, to save loss from abrasion and furnish a cheaper and more convenient currency. It has long been regarded as a desirable object to secure the return of this large gold circulation to the Treasury vaults. Pacific Coast Congressmen who have studied the situation say gold certificates would be accepted, but silver certificates would be rejected. It is conceded that silver certificates of large denomination would be rapidly returned to New York, but it is thought for the sake of convenience smaller denominations would certainly be retained in circulation if the other forms of money are withheld. Secretary Fairchild states that thus far he has not issued any orders for the substitution of paper currency for gold coin as a medium of exchange in the Pacific Coast States.

There is, perhaps, more certainty of silver certificates being issued than gold. There is a pretty general feeling, however, among the people of this coast that gold answers very well as it is, and it is not probable that they will take kindly to paper currency. So many Eastern people have come here of late that paper is more familiar than formerly. We have, however, been used to hard coin so long that our people are not desirous of any change in this matter. If the change is made, it will not be until July.

J. B. RANDOL, manager of the New Almaden quicksilver mine, has gone East.

Silver Bullion.

The speculators in New York, who gamble in almost everything, are now talking of taking up silver as a shuttlecock. They propose to make New York, instead of London, the central market for silver. It is proposed to deposit the bullion in some bank or other safe place and issue certificates of deposit to represent it, and that speculation shall be carried on in these certificates. Grain is speculated in in the same way, and after Sept. 1st other staples will also be sold on warehouse certificates. Orde petrolum is represented by pipe-line certificates, in which there is a large speculation. The idea is to have the bullion certificates listed by the Stock Exchange.

Ex-Treasurer Jordan, vice-president of the Western National bank, says: "There are numbers of men getting the idea into shape, but it will not be ready for several weeks yet. The Western National bank will not speculate in silver. We will issue certificates for silver, or rather act as a registration organization, but we shall not do anything else, for we propose to do only a legitimate banking business. London now controls the silver market of the world. If this scheme goes through, as it surely will, that controlling power will be in this city. Instead of our being dependent on London for the price of silver, London will have to depend on us. The organization of the scheme has so far progressed that the form of certificate is now being discussed."

Director of the Mint Kimball thinks that the proposition to make New York the chief seat of the bullion trade, and thus transfer the center of the silver market from London to New York, is impracticable. The price of silver in London is the price of silver in New York, less the cost of transportation. The London silver quotations are received every day, and on these quotations the price of silver is fixed. Silver bullion might be stored and warehouse certificates issued against it, and those certificates be traded in the same as any other commodity; but the Director added: "I do not see how there could be much made by the transaction. The same thing

was attempted with iron some time ago, but it was a failure. The Iron Exchange, or warehouse, or whatever it was called, may be still in existence, but it has never done much."

Mr. Kimball does not think the syndicate could corner the silver market and put the price of silver up. England gets her silver from Mexico and South America, as well as from America, and if American silver was forced up there would be a greater export market for Mexican dollars. The price of silver in London is not so much regulated by the supply as by the allotment of India consol bills—that is, drafts made by the Indian financial authorities in London on the Government of India, and the price at which these drafts are purchased in London by brokers and merchants depends on the state of trade and the demand that may exist for the same. Though this is not the sole controlling factor in the price of silver in London, it is a factor of considerable importance. In 1878 an attempt was made to corner the silver market and make the Government pay an enhanced price for it, but we bought in London—that is to say, we paid the London price, plus transportation, and then it cost less than we were offered it here. If anybody wants to corner silver he will get very much of a job.

This scheme, if there is anything in it, is simply one to make another article to speculate in.

The Late Milo Hoadley.

Milo Hoadley, a pioneer of this city, and a well-known civil engineer, was killed by being thrown from a buggy, near Sonoma, Tnolmne county, on Thursday of last week. Mr. Hoadley was 77 years of age. Milo Hoadley was born in Plymouth, Conn. He came to this State in October, 1849, and at once entered upon the practice of his profession of civil engineering. He came prominently before the people about the year 1854 in connection with a proposed system of sewerage of the city, which was known at the time as Hoadley's grade. Many people claim now that had Mr. Hoadley's ideas been carried out the trouble of late years in draining and sewerage of the city south of Market street would have been avoided. He was a member of the old Vigilance Committee and had been a member of the Society of Pioneers since its organization. Mr. Hoadley was City Surveyor and City Engineer of San Francisco in the early days, and did a vast amount of work in laying out the streets, etc., here. He

The Nanaimo Coal Mine Disaster.

The terrible disaster at the Nansimo coal mines recently was the cause of the loss of over 150 miners' lives and the destruction of a great deal of property. We give on this page an engraving from a photograph of the Vancouver Coal Mining Co.'s shaft No. 1, showing the hoisting works, engine-house and office before the disaster occurred. The mine is, as the views show, near the edge of the salt water, and the drifts of the mine run out under the sea.

There are several shafts in this mine, but this No. 1, of which we give the view, is the point where the fire occurred after the explosion underground. The two wheels shown at the top are the sheaves on the gallow-frame over which the wire ropes pass to the reels on the engines in the engine-house. The other ends of the ropes are secured to the cages which travel up and down in the shaft, after the manner of elevators in buildings. The men descend into the mine on these cages and are hoisted out by them. Coal is wheeled in small cars on to the cages and hoisted to the surface, where it is dumped into the bunkers, as the receiving bins are called.

Mariposa County Resources.

The Diltz Mine.

We this week received a visit from Mr. Angevine Reynolds, editor and proprietor of the *Mariposa Gazette*. Mr. Reynolds has been in bad health for several years and is here to experience a change of climate and to secure the services of a physician. He has been here a little over a month and it would seem that the desired change of climate is about all that is needed, for he has improved surprisingly. Since his arrival here he has been engaged in introducing mines of his county, and more particularly the celebrated Diltz mine, which has been referred to frequently through the columns of this paper in its mining news, taken from the *Mariposa Gazette* and other papers.

The Diltz mine is evidently a fine property, judging from all that has been said and the rich specimens of gold that have been taken therefrom and exhibited to the public. Mr. Reynolds has with him, which he exhibited to us, a 10-pound specimen covered with coarse gold. It is a beautiful nugget, rare to be seen, and contains something over \$2000.

This mine has in the past 16 years produced considerable gold and a great number of rare specimens. Capt. Diltz, the owner, has always refused to build a mill or hire men on account of its richness in specimens and pockets, which were too tempting, as a general thing, for human nature to withstand. We are told that the mine shows a true fissure vein from a foot to 14 feet thick of both high and low-grade ore. The mine bears other characteristics which are valuable, and is situated in one of the richest and best gold-producing sections discovered since the days of '49.

It is generally believed there are hundreds of thousands, if not millions, of dollars in the point of mountains through which this mine passes. What is needed and will require the aid of capital is to run a tunnel 1700 feet on the vein, to drain the water and to put the mine in a position for stopping. This done, if deemed necessary, mills could be erected and the mine handled in the most profitable manner.

Mr. Reynolds is armed with maps and plan

showing the Diltz mine in all its phases, and unless some one desires to purchase the property as it stands, he wishes to organize a syndicate which will work the mine to the best advantage. Mr. Reynolds has a fine map of the county, which shows all the important mines, rivers, towns, and places. He can point to several most excellent farms, ranches, and vacant land, which can be purchased, with improvements, at rates amazingly cheap at this time. Yosemite valley is in Mariposa county, and it will not be long before it must, with others, realize a boom, for it has the advantages of a lovely climate, rich mines and fertile valleys, and rolling hills covered with timber and springs of water, all of which will make lovely homes for the industrious immigrant.

Mr. Reynolds has established an office at 131 Montgomery street, opposite the Occidental hotel, where he will be for a time, with a view to giving information to immigrants in search of homes, or to capitalists in want of mines. His office hours will be from 10 A. M. to 4 P. M.

RIVERSIDE is to have an electric railroad 12½ miles long. An organization of local capitalists has already been made and sufficient capital raised.



SHAFT NO. 1 OF THE VANCOUVER COAL MINE, NANAIMO, B. C.

was well known to most of the civil engineers in California. He was a member of the Technical Society of the Pacific Coast, and took great interest in its proceedings. Mr. Hoadley was a genial man, well liked by all who knew him.

BITUMINOUS ROCK MINES.—The *San Luis Obispo Republic* says: James Cormac, an experienced miner, has been made superintendent of the bituminous rock mines, and is opening them for extensive operations in a thorough and workmanlike manner. A hillside has been cut away, leaving a large face of the pure bituminous rock exposed. He says he can now get out 500 tons a day, and will soon be enabled to take out 1000 tons daily, if required. The supply is unlimited; the demand and facilities for transportation are all that is wanted.

THE GRASS VALLEY TIDINGS says: The Chinamen propose to swarm into hydraulic mines, work as long as allowed, get themselves arrested and jailed in Yuba county for 500 days each, and thus eat out Yuba county. They will keep both the jail and hydraulic mines full of men all the time.

The Omaha smelting works employ 500 men.

From these bins it is discharged into cars which carry it to the wharves and deposit it on the vessels for shipment. At the time of the explosion many miners were in the drifts and etopes which extend from the bottom of the shaft out under the waters of the harbor of Nanaimo. No such disastrous accident as the one which occurred at this mine has ever happened in the coal mines on this coast before.

It is to the credit of the people of California that liberal contributions in money were at once sent to assist the families of the dead miners, in addition to the sums collected in British Columbia. Many rich men subscribed, and many poor ones too. A feature to be noted is the subscription from California miners. The Plumas Eureka mining employee contributed \$225. The miners of the Savage and Hale and Norcross sent \$300. The New Almaden miners sent \$283, the company, \$250, and Manager J. R. Raudol, \$250 more, making from this mine \$817. In this connection it may be stated that the names of the contributing miners were sent to Mr. John Rosenfeld, the agent of the mine here, when the money was forwarded.

ABOUT 500 tons of chrome ore was shipped from Livermore to Philadelphia last week.

MECHANICAL PROGRESS.

Welding Copper.

The recent discovery of a process for welding copper has created much interest all through the country. In addition to what has already been given upon this subject in these columns, the following from the *Boston Journal of Commerce* will be read with considerable interest:

The successful welding of copper was one of the lost arts. Scientists have expended millions of dollars in attempts to rediscover the art known to the ancients, but have failed utterly, its discovery being reserved to an unpretentious blacksmith named James Burns. James Burns was, until very recently, a blacksmith in the Allegheny Valley railroad shops, at Verona, Pa. He believed copper could be welded, and with patience and perseverance set himself the task of rediscovering the long-lost art, and after eight years of toil and study succeeded in welding together, perfectly, pieces of copper. Elated with success, but careful to keep his method a secret, Burns announced his discovery and was laughed at, but when he resorted to hammer, anvil and fire and in less than ten minutes welded together two bars of copper more perfectly than it was possible to weld steel, the doubters became converts and realized that a discovery had been made scarcely second to any made during the present century. Park, Scott & Co., extensive workers in copper, of Pittsburgh, would not believe that copper could be welded, notwithstanding the welded samples were submitted to them, whereupon Burns convinced them by going into their works, and, in the presence of Mr. Scott, the superintendent, and others, successfully welded, with ordinary tools, a number of pieces of copper, making welds so strong by pounding the pure copper together that it is impossible for them to give out as do brazed parts.

Mr. Burns' success is due, says the *Industrial Gazette*, to a chemical mixture, or compound, the ingredients of which are kept secret. The mixture is cheap, and very little is necessary in making a weld, the discoverer in his public tests using only a small phial full. The discovery opens up a new field in copper working; in fact, will revolutionize some lines of manufacture. The inability to weld copper has always been an insurmountable obstacle to the economic use of that metal in many directions, making it very expensive, where its use was absolutely necessary, owing to its peculiar qualities. In making copper steam pipes for engines and locomotives they had to be worked up out of the solid raw mass of copper by a sort of boring process, which was tedious and costly. To make a copper ring for fitting over a joint in pipes or cylinders, it had to be cut round out of a square piece of solid plate copper. This caused waste, and the consumer was charged for the whole square. The waste could often not be melted over into another plate, because by the present smelting methods the slightest impurity mixing in it will spoil the whole mass. To repair broken or defective copper pipes, chambers or vessels, brass had to be used, by which in a whole day's labor the piece could be brazed. But should an intense heat ever strike the brazed part afterward, the brass would melt and thus the piece be ruined. Mr. Burns' discovery, however, revolutionizes old methods. A straight piece of copper can now be curved into a circle and then welded together in a ring for fitting over joints, thus saving the waste of cutting it from a square plate. Pipes may be made in the same way, being welded instead of worked out of the solid. Mr. Burns has even made a copper boiler for a small engine by his welding—something unheard of. In the process of welding the copper is purified, another remarkable feature of the discovery. No impurity mixing in the smelter interferes, and old scraps have been remelted and welded into all sorts of pipes, joints, and fittings by Mr. Burns.

The Value of Exhaust Steam.

We notice, in the practice of model establishments where the most attention is paid to economy in the use of steam, an increased appreciation of the value of exhaust steam for purposes of heating and for the various processes connected with manufacturing. Steam users are realizing that true economy does not consist alone in developing a horse-power upon their engines with the least possible coal per hour, but in doing the entire work of the mill, including the heating, with the least possible expenditure of fuel, even if the proportion of coal used for power proper is greater. The old idea that there is no economy without a condenser is being sacrificed to the recognition of the fact that it is better to use up the latent heat of the exhaust steam in heating the mill, and in the various processes of cleansing, dyeing, slashing, drying, etc., than to allow it to run into the river in the overflow from a hot well. While the condenser, properly applied, is an important factor in the direction of economy, its use may be easily carried beyond a beneficial point. In one of the model mills of New England where the steam plant and its management have been the subjects of much scientific thought and study, the practice during the past winter has been to run a large compound engine backward, i. e., to use high pressure steam in the large cylinder and run the small cylinder condensing. The large cylinder exhausts, under the required back pressure, a large volume of steam into the

heating circulation, and a portion of this steam is taken from the circulation, expanded in the small cylinder, and exhausted into the condenser, leaving the major portion for heating and manufacturing purposes. While this may appear crooked engineering to those whose interest lies wholly in the engine itself, we have no doubt that it will result in a lower aggregate coal bill than if the engine had been run as it was intended it should be.

The Laws of Friction.

Friction is greatly influenced by the smoothness or roughness, hardness or softness, of the surfaces rubbing against each other.

It is in proportion to the pressure or load; that is, a double pressure will produce a double amount of friction, and so of any other proportionate increase of the load.

The friction does not depend upon the extent of surface, the weight of body remaining the same.

The friction is greater after the bodies have been allowed to remain for some time at rest in contact with each other than when they are first so placed: as for example, a wheel turning upon gudgeons will require a greater weight to start it after remaining some hours at rest than it would at first. The cause of this appears to be that the minute asperities which exist even upon the smoothest bodies gradually sink into the opposite spaces, and thus hold upon each other. It is for the same reason that a greater force is required to set a body in motion than to keep it in motion. If about one-third the amount of a weight be required to move that weight along in the first instance, one-fourth will keep it in motion. The friction of axles does not at all depend upon their velocity; thus a railroad car traveling at the rate of 20 miles an hour will not have been retarded by friction more than another which travels only 10 miles in that time. It appears, therefore, from the last three laws that the amount of friction is as the pressure directly, without regard to surface, time or velocity.

Friction is greatly diminished by unguents, and this diminution is as the nature of the unguents, without reference to the substances moving over them. The kind of unguent which ought to be employed depends principally upon the load; it ought to suffice just to prevent the bodies from coming into contact with each other. The lighter the weight, therefore, the finer and more fluid the unguent should be, and vice versa.

THE RELATIVE VALUE OF NATURAL GAS AND COAL.—Of Pittsburgh coal, 55.4 pounds contain the same number of heat units as 1000 cubic feet of natural gas. With coal \$1.20 per ton, 1000 feet of natural gas would then be worth 3½ cents. But by tests made by the Westinghouse Air Brake Company, 1.18 cubic feet of natural gas evaporated 10.38 pounds of water—that is, one pound coal equals 12.25 cubic feet of gas, or 1000 feet gas equals 81.32-49 pounds coal. This difference results from the expenditure of heat necessary to raise solid fuel to the gaseous state, which must be done before combustion can take place. In a house grate the loss on this score from using coal would be more than in a large furnace of a factory. Hence the greater economy in the use of natural gas is in houses and small establishments. Two years ago only six rolling-mills and steel works in the United States used natural gas as fuel; now we have a record of 63 rolling-mills and steel works which use the new fuel, and of 16 which are making preparations to use it. Every rolling-mill and steel works in Allegheny county, Penn., 55 in all, now uses natural gas. In Western Pennsylvania, outside of Allegheny county, it is used in 12 mills and steel works, and seven others, including the rolling-mills and the Gao-tier departments of the Cambria Iron Works, 79 miles east of Pittsburgh, are preparing to use it. One rolling-mill in Ohio is now using it, and eight mills are getting ready to use it. At Wheeling, West Virginia, one mill is making arrangements to introduce it. In all but a very few of the mills and steel works referred to, natural gas is used as fuel exclusively.

STEAM-BOILER IMPROVEMENTS.—Considerable is said about improvements in boilers, but there are boilers in actual use that are giving nearly all the heat of coal into steam, and if some practical method could be found for saving the loss in flue gas, the boiler would be practically perfect. We are fairly successful in getting the heat of coal into steam, but very unsuccessful in converting this heat into work. It should be remembered that it is heat we have to deal with, and pressures, etc., are mere incidentals, while the engine is a crude arrangement of converting this heat into work, and engineers should be as careful of the unite of heat that perform this work as they are of the pennies that make the dollars.

LOCOMOTIVES AND RAILROAD BRIDGES.—The great increase in the weight of the locomotives which have recently been put upon railroads for hauling freight trains, requires firmer roadbeds, heavier rails and much more substantial bridges than those heretofore constructed when lighter locomotives were used. It is said that the iron and steel bridges on the Pennsylvania railroad built several years ago prove to be too flimsy for the 60 ton freight-haulers recently put on—118,000-pound engines—and new structures of stone or heavy steel are replacing all other so far as practicable.

SCIENTIFIC PROGRESS.

The Early Denuding Forces.

In a careful examination of the earth's surface the observer is always struck with the immense displacement of material which must have occurred, after the present mountain chains had been formed, by some powerful denuding agency unknown at the present time. We can conceive of no present conditions of the elements which could have been adequate to such results. There can be no disputing the fact that the immense hills and vast plains or tablelands of gravel, piled up in some regions, must have been broken up and removed from their original places of deposit by aqueous agency. But our present supplies of water from rainfall, or any other source, are quite insufficient for such an immense work. Glacier action and the secondary effects of existing water-courses serve only to bring to light and magnify the results of some earlier and more powerful agencies. The immense mountains and tablelands, composed of ancient drift deposits which have recently been opened by the hydraulic miners of this State, furnish a notable example of the power and vastness of these ancient denuding forces.

Mr. Proctor has lately expressed the opinion that the present denuding effects of air and water are absolutely as nothing compared with the denuding forces which must have been in operation when the earth was young—that the oxygen and nitrogen of the air are but a residuum of what was once there; but, beside these gases, now in due proportion to support the earth's life, there were immense quantities of carbonic acid gas, of sulphurous acid, sulphureted hydrogen, chlorine, boracic acid and other destructive gases, some ready to assume the liquid form and thus be still more destructive. Mr. Proctor thinks there must also have been immense quantities of water in the form of vapor—in fact, the pressure of that primeval atmosphere must have been so great that the waters of such oceans as then existed could have turned into steam only at a temperature so far above the boiling point at the present atmospheric pressure that the surface of the ocean must actually have glowed with inherent lustre; the water vapor in the air must have been steam at high pressure and intensely hot, and the rains falling then must have been torrents of hot water, impregnated with destructive acids, and falling on intensely heated rocks.

ELECTRIC LIGHT WITHOUT MACHINERY.—A new electric light, without the employment of dynamo-electric machines, has been introduced in London. The *Citizen* says the system is known as the upward battery, and the plant is of the simplest description, occupying a small recess in the cellar about 6 feet by 5 feet. The management of the battery merely consists in turning on a couple of taps and winding up a clock once in 24 hours, an operation which is certainly within the scope of the meanest capacity. The battery then works on automatically and silently, generating and storing electricity continuously day and night. The upward battery differs entirely from all other primary batteries, and possesses none of their disadvantages. It consists of carbon plates and zinc cylinders, placed in earthenware cells, the zinc being consumed in about six months by the action of chlorine gas. The gas is made by admitting hydrochloric acid to an earthen pan containing manganese, a sufficient quantity being made in two hours to supply the battery for 24 hours, and is stored in ordinary drain-pipes. The plant is inexpensive, a battery—including gas retort and acid jars, gas-holders, primary cells, accumulators and clock-work apparatus, for charging the storage batteries—being supplied for \$280. The manufacturers have published an estimate for a plant sufficient to light an ordinary house, with 25 lamps, of which ten may be lighted for six hours every night, five more in other rooms for half an hour every night, and the whole 25 lamps for six hours at intervals of three days, during which time the extra current is being stored. The cost of such a plant would be about \$680.

THE QUAKING EARTH.—The peculiar terror of an earthquake lies mainly in the suddenness of its approach. Volcanic eruptions are usually preceded by vast rumblings, or jets of steam, or other unmistakable tokens. Hurricanes and cyclones in like manner have heralds that announce their coming. But with an earthquake there are no premonitory symptoms. The great earthquake which took place at Lieben in the year 1755 found the people engaged in their ordinary occupations. All the shocks were over in about five minutes. The first shock lasted about six seconds. In that brief space of time most of the houses had been thrown down and thousands of men, women, and children crushed beneath the ruins. At times the ocean lends fresh terrors to the scene. Thus at Lisbon, a wave of water over 50 feet high rushed in among the houses and covered what still remained. In the island of Jamaica on a different occasion, 2500 houses were hurled in three minutes under 30 feet of water. Recent

delicate scientific experiments have discovered the fact that the surface of the land is never absolutely at rest for more than 30 hours at a time. Thus those great earthquakes which make epochs in history are merely extreme cases of forces that seldom sleep.—From a lecture by A. Forbank.

HEAT AND MECHANICAL MOTION.—Professor Tyndall, in his lecture on heat, had what he termed a thermo-electric pile so arranged that when anything colder than the surrounding air was put against the face a pointer would turn in one direction, and if anything warmer, it would turn in the other direction. He then filled a vessel with air under pressure, and allowed the vessel to remain in the room until the air had become of the same temperature as the air in the room. Opening a pet cock, he directed the air from the pipe against the face of the pile, and the pointer showed that the air was colder. He then took a pair of bellows and directed that against the face of the pile, and the pointer showed that the air from the bellows was warmer. In the first case the work performed of forcing the air against the pile was done with the pressure of the air within the vessel, therefore the heat performing the work must be taken from the air in the vessel, making it colder; but, on the other hand, the work was performed by the man's muscles, and the heat was taken from the body. This is a fair illustration of the phenomenon of heat being converted into mechanical work. This subject of heat, while somewhat complicated, is one of the most interesting and important studies of the young engineer, as without a thorough knowledge of this a large part of his observations must be in the dark.

CHANGES IN BLEACHING POWDER BY KEEPING.—A very interesting series of experiments has recently been made by Mr. John Pattinson, of England, to ascertain what changes take place in bleaching powder by keeping. He placed two casks of bleaching powder, and samples of the same, in sealed glass bottles in the cellar, and kept them there from Jan. 29, 1885, to Jan. 5, 1886—nearly a year. The temperature of the cellar ranged from 35° to 61° F.; during the 12 months repeated tests were made of the bleaching powder; at the end it was found that the loss of available chlorine was nearly the same in the casks and in the bottles, though the casks had increased in weight from the entrance of moisture and carbonic acid. The loss of chlorine was only from 2 to 2½ per cent of the weight of the bleaching powder; but of the weight of available chlorine the loss would be about eight per cent, the sample being from 36 to 38 per cent quality. Mr. Pattinson proposes to make experiments at a higher temperature for a lengthened period. It is to be noted that the small amount of chlorate of lime found in the bleaching powder at the commencement had entirely disappeared at the end.

THE EFFECT OF CERTAIN ODORS.—The aroma of red cedar is fatal to house-moths; the aroma of black walnut leaves is fatal to fleas. It is a matter of common observation that persons engaged in the business of making shingles from odoriferous cypress timber in malarial districts are rarely, if ever, affected by malarial diseases, and that persons engaged in gathering and distilling turpentine do not suffer from either malarial diseases or consumption. It is said that when cholera was epidemic in Memphis, Tenn., persons working in livery stables were entirely exempt from it. It is affirmed that since the destruction of the clove trees on the island of Ternate the colony has suffered from epidemics unknown before; and in times when cholera has prevailed in London and Paris those employed in the perfumery factories have escaped its ravages.

ANOTHER EARTHQUAKE THEORY.—A possible cause of earthquakes in Europe has been suggested to the French Academy of Sciences by M. A. Blavier, who associates the great disturbances of 1755, 1884 and 1887 with abnormal accumulations of ice about the North Pole. He supposes such accumulations to have caused a deflection of the Gulf stream away from Europe, producing great climatic changes and a slight disturbance of equilibrium in the sea-bottom, followed by a possible local fracture along the line of least resistance. Evidence of the in-rush of cold oceanic waters is furnished by the disappearance of sardines from the west coast of Europe during the years in question.

FORMATION OF DIAMONDS.—A Swiss physicist, Prof. Simmler, maintains that diamonds have been formed by the taking up of soluble carbon by liquid carbonic acid, and its subsequent deposition in a crystalline form on the evaporation of the acid. This could only take place in rock cavities strongly compressing the carbonic acid, which would quickly disappear on release from the pressure.

PUTTING TO SLEEP BY TELEPHONE.—In France, persons are said to have been put into a hypnotic sleep by telephone. A newspaper editor was hypnotized in two or three minutes after placing the telephone to his ear, the operator being a mile distant.

IODINE, hitherto known in nature only in combination with other elements, is now found in a free state in the water of Woodhall Spa, near Lincoln, in England. The water is colored a decided brown by the iodine,

GOOD HEALTH.

The San Francisco Medical Association on Cancer.

Our readers will recollect the brief notice which was made in these columns of the meeting of the San Francisco City and County Medical Association, on February 22d, the subject of discussion being "Cancer." We now append the official report of the meeting as made by the secretary in the *Pacific Medical and Surgical Journal* of this city:

The meeting having been called to order by the president, Dr. James Simpson, the minutes of the former meeting were read and approved.

On the motion of Dr. John L. Morse, the reading of Dr. Frisbie's paper was dispensed with, and he was invited to open a discussion on the same subject. As Dr. Frisbie declined, the president requested Dr. Morse to open the discussion.

Dr. Morse said that before discussing the curability of cancer it was necessary to come to some understanding of what is meant by cancer, as the term is popularly used to describe any tumor that brings about or contributes to a fatal termination. The origin of the disease has been ascribed to various sources. Virchow traces it to connective tissue, Billroth to epithelial structures, another authority to the endothelium of the lymphatics, and Conheim to mal-position of the structural layers in the fetas. The therapy of the disease may be summed up in the statement that nothing will remove carcinoma except the knife and fire. The general opinion is that only early operation will be of any avail, and even then that the disease will recur in a few years; so, in the face of this, we hardly can expect much from medicaments.

Dr. Rosenstirn did not believe that because we do not know the etiology of the disease, we should, therefore, cease to discuss its therapy. It is true that the various epitheliomata have been somewhat amenable to treatment by excision, but we cannot say the same regarding cancer of the pylorus.

Fowler's solution, chian turpentine and other remedies have been used very extensively in the treatment of different varieties and have met with a small degree of success, and, therefore, it is our duty to try every creditably indorsed remedy either for the cure or amelioration of the disease.

Dr. W. P. Gihbons said that he never had been successful in prolonging the life of a patient suffering from true carcinoma by medications, and believed that one great obstacle to a successful therapy lay in the difficulty of diagnosis in the early stages. He presented to the society the sketch of a carcinomatous liver taken from a case occurring in his own practice.

Dr. Simpson had seen many cases of cancer, but could only speak of them from a clinician's point of view. He did not believe any case of internal cancer had ever been cured, and those reported as such could be explained either by errors in diagnosis or deceit on the part of the medical attendant. The highest object of treatment, therefore, can only be to make life endurable to the patient and let him die easily.

Dr. Stallard had directed his attention to this subject for many years, and agreed with Dr. Morse that greater efforts should be made to obtain a correct etiology of the disease, which would certainly contribute to the possibility of its prevention or amelioration if we cannot cure it. There has been a great increase in the number of people suffering from carcinoma during the last 40 years, and it becomes a matter of interest to know the cause of this increase, which can only be done by collective investigation of the social class, habits and employment of those suffering from it which would yield us some idea of the conditions favoring it. In the meantime we must not lose sight of treatment, for while we have no great hope in medicine, there are well-authenticated instances of relief from chian turpentine and the local applications of bromine, and as they ameliorate the sufferings of the patient, they should be tried. Dietary probably has considerable to do with the increase of the disease within the last 40 years, as during that time tea, sugar and coffee have come into more general use, and it is an interesting question how far these may have influenced cell nutrition.

There being no further business, the society adjourned.

In commenting on the above, we would remark that a very important feature in the proceedings of the meeting was the refusal of the association to listen to the reading of the paper which was intended to open the discussion. After a few preliminary remarks, the author of the paper proceeded to present to the association some original and very important observations which he, in connection with several other medical gentlemen, had made in regard to the alleged success which had attended the practice of a certain specialist in San Francisco, in the treatment of a large number of cases which had been pronounced "cancer" by several of our most prominent physicians and surgeons. A number of these cases had been once and twice extirpated by the surgeon's knife, and the same surgeons had announced their second and third

return, with the advice that they should be again submitted to the knife. The patients in question were subsequently placed under the treatment of the specialist referred to and the cancers removed, in some cases (where no knife had been used) by constitutional treatment and massage, with simple vegetable ointments. No caustics are used by this practitioner—no minerals in any form whatever. Complete success had attended a very large number of cases, and, with only one exception, there had been no return of the malady, although from five to ten years have intervened since the patients had ceased to take treatment. The chief object of the paper in question was to bring this matter to the direct attention of the society, and secure, if possible, an official investigation into the matter. But every effort to accomplish that purpose was frustrated by a decided vote to suppress that portion of the paper in which the effort was made to bring something new to the attention of the association. The society preferred to discuss the question from "a scientific standpoint," as they termed it, or from observations which were only to be found in the "hooks." The reason assigned for that course was that the practitioner employed secret remedies and was not a member of the regular medical school. The fact was ignored that the practitioner had sought the privilege of taking up a regular course of study at one of our city medical colleges and been refused admission simply because she was a woman. (Such a decision could not be made to-day; public opinion having since secured the admission of women to medical schools.) Had her petition been favorably received, her treatment would have been sooner and no doubt much more perfectly developed and freely given to the profession and the world.

But as by the act of that body she was compelled to continue her work unaided and in comparative darkness, now that she has developed what appears to be a successful constitutional treatment of cancer, unaided by the profession, she proposes to retain the secret temporarily for her own pecuniary benefit. She is willing, however, to afford every possible opportunity to any regular members of the medical profession to test her skill and study her mode of treatment in any and the most severe manner which they can devise. She is willing to test the success of her practice on any patient or patients who may be selected, when the disease has not reached an extreme crisis.

The object which the writer of the paper referred to had in view, and the object which the writer of these articles has in view, is to secure unquestionable medical evidence of the success or non-success of the remedies in question. If the former should be the result, it is proposed to make an appeal to the public or the Government to raise a sufficient sum of money to purchase the secret and give it to the faculty and the world.

The matter could be readily decided by a proper investigation in a very short time, and the writer is assured that, if favorably decided, there would be no difficulty whatever in obtaining any reasonable amount which might be required to place such invaluable information before the medical world. The fact that there are such large numbers of persons in this city and vicinity that have certainly been completely relieved by this practitioner of what our best physicians have freely pronounced cancers, any candid person would think ought to be sufficient to warrant an investigation at once. In common with large numbers of our leading citizens with whom we have consulted, we hold that it is the bounden duty of the medical faculty of this city to recall their act of February 22d, and, in the name of common justice and humanity, make inquiry into a matter which is of such paramount importance to the health and lives of this community—of the entire world. What we want, and what the public wants to know, is, have these persons whose names and cases have been published, and many others whose names might be added, been really cured of cancers? Will the physicians whose names have been freely published in this connection deny that they have pronounced them genuine cases of cancer? If these people have been afflicted with cancers, how is it that such patients, who, according to the hooks and the discussions of the February medical meeting, ought to have been in their graves long ago—how is it, we ask, that they are to-day walking about the city and attending to their business like other persons? Have the physicians and surgeons made mistakes in their diagnosis in so many cases? Have they made so many terrible mistakes in cutting out what were only innocent tumors?

Are they prepared to say that they have been mistaken in their diagnosis? These are important questions for somebody to answer. There is something wrong somewhere. This is an inquiry of no ordinary importance. Large numbers of people in this city are becoming quite nervous over it—and well they may!

We learn by correspondence and personal conversation that many physicians outside of this city are beginning to take a different view of the question from that taken at the late meeting of the Medical Association of S. F. They hold that the evidence produced fully demands an inquiry, and many propose to take the necessary measures to secure it. So far as the writer is concerned, he simply desires to reach the truth, wherever or whatever it may be. He has been sorely afflicted in his own family by this terrible scourge, and with many others he is

determined to know whether a true constitutional remedy for cancer has been discovered. The evidence so far, to the mind of the writer and to the mind of every physician who has looked carefully into the matter, is largely in favor of the affirmative, and we propose to continue this agitation until some person properly qualified and duly authorized shall inquire into it, and make a full and unprejudiced report thereon. Humanity and scientific research demand it. The public demands it.

Starving the Teeth.

"Teeth are just as easily starved to death as the stomach," said a lecturer before a Brooklyn audience the other night. "The fact is that you and your fathers have from generation to generation been indolently starving your teeth. In one way it is a blessing to have been born of poor parents. What food the poor give their children is of a variety that goes to make strong bones and teeth. It is the outside of all the grains of all cereal foods that contain the carbonate and phosphate of lime, and traces of other earthy salts, which nourish the bony tissues and build the frame up. If we do not furnish to the teeth of the young that pabulum they require, they cannot possibly be built up. It is the outside of corn, oats, wheat, barley and the like, or the bran so called, that we sift away and feed to the swine, that the teeth actually require for their proper nourishment. The wisdom of man has proven his folly, shown in every succeeding generation of teeth, which become more and more fragile and weak. These flouring mills in Minneapolis are working destruction upon the teeth of every man, woman and child who partakes of their fine holsted flour. They sift out the carbonates and the phosphates of lime, in order that they may provide that fine white flour which is proving a whitened sepulcher to the teeth.

"Oatmeal is one of the best foods for supplying the teeth with nourishment. It makes the dentine, cementum and enamel strong, flint-like and able to resist all forms of decay. If you have children, never allow any white bread upon your table. Graham bread is made of whole wheat ground, not holsted, so that the bran, which contains the minute quantities of lime, is present. To make a good, wholesome, nourishing bread, take two bowls of wheatmeal and one bowl of white or holsted flour, and make by the usual process. Nothing is superior to Boston brown bread for home and tooth building. This is made out of rye meal and cornmeal. Baked beans, too, have a considerable supply of these lime salts, and should be on your tables, hot or cold, at least three times a week. In brushing the teeth, always brush up and down, from the gum instead of across. Brush away from the gum and on the grinding surfaces of your teeth."—*Brooklyn Eagle*.

USEFUL INFORMATION.

HOW TO CLEANSE DROP OIL.—An interrogator in an Eastern paper wanted to know how he could cleanse the thick drop oil from the engine, hearings, shaftings, pulleys, etc., so that it could again be used for lubricating, and received the following answer in reply: This drop oil is collected in many mills and factories to be cleaned and used again. A little apparatus has been constructed for this purpose, which, it is reasonable to suppose, is patented. It may be described as follows: The apparatus is a box-like concern, of several "stories," the interior either lined with or consisting entirely of lead. Above, it has a shoulder like a funnel, into which is poured the oil to be cleaned. The purified oil passes off through an escape-pipe in the bottom. The different shelves, or "stories," are perforated and covered to a height of about two inches with raw, loose cotton, through which the oil must percolate. The cotton serves as a filter and retains all kinds of contaminations. After the oil has in this manner passed through the several shelves, it is nice and clean and drops into a vessel underneath. The dirty cotton is occasionally replaced by clean. This is about the most inexpensive way of effecting it that I know of. It is also necessary to add that the apparatus must stand in a warm place. The cleaning of the oil with chemicals is both a tedious and a doubtful process, because even after thorough washing it may still retain traces of acids, rendering it unfit for lubricating purposes.

THE HEATING POWER OF GAS.—A series of tests has recently been made by Dr. Fischer, the well-known German chemist, showing that in ordinary domestic stoves in use not more than 20 per cent of fuel consumed is really utilized for warming the rooms, whereas, with stoves burning gas, 80 per cent and more of the possible effect is obtained. In a sugar manufactory at Elsdorf, it is stated no steam engines have been used for several years. Gas is made at a cost of about 20 cents per 1000 cubic feet, and is used for lighting and driving gas engines. At the Essen works, water gas is made at a cost of 4 to 16 cents per 1000 feet, and serves both for fire and lighting.

DISCOVERY FOR CONVERTING NON-SAPONIFIABLE OILS.—Baillard, of Rouen, has patented a discovery which, if actually what it is stated to be, will have far-reaching consequences. It is for converting non-saponifiable oils into saponi-

fiable oils, and so admitting the whole class of mineral oils to all the uses of fat oils. The change is effected by oxidation; in the provisional specification he says that his discovery is based on the fact that oleic acid possesses in a high degree the property of transferring to mineral oils a portion of its oxygen; the same property resides in acrolylo or acroleic acid and animal or vegetable fats in a rancid state. In the complete specification the use of chlorine as an oxidizing agent is mentioned along with hasio oxides. Mineral oils treated as described are said to be perfectly applicable for use in the woolen manufacture, and by the addition "of from 2 to 10 per cent by weight of fixed vegetable oils, such as cotton, castor, etc., are being employed as mordants in dyeing fabrics composed of vegetable fibers."

SINGULAR EFFECT OF A LIGHTNING STROKE.—A very singular result from a stroke of lightning is reported by a correspondent of the *Germantown, Pennsylvania, Telegraph*, as having occurred in the town of Barrington, Yates county, N. Y., near the celebrated Crystal spring. The report reads as follows: "It did not rain very hard, but the thunder and lightning were just fearful. Lightning struck in six or eight places in a space a mile in diameter. Among the rest it struck a large wild cherry tree some few feet in diameter and 20 or 30 feet to the limbs. It literally tore the tree all to splinters, scattering the pieces over a space 70 or 80 rods in diameter. A goat was under the tree, and it was, of course, killed. On going to it, it did not show any mark of hurt, but just a little drop of blood on its nose. When the skin was taken off it was found to be crushed to a mass of jelly. The carcass looked as though it had been ground to mincemeat. On taking the skin away it had not the least resemblance to a carcass; bones and all were reduced to a mass of pulp. It is a singular case. Let some of your scientists explain."

GREEN AND DRY TIMBER.—A discussion is going the rounds of the press as to the relative strength of wet and dry timber. We do not believe there is much to be made out of the discussion. Some kinds of timber are stronger when dry, while other kinds are stronger when wet or green. It is safe to say that all woods are harder and less liable to bend when dry than when wet or green. But most hardwoods when wet will possess more tensile strength than when dry. Timber thoroughly seasoned is more brittle than when green, and with the necessary force will break square off, while the same timber green would stand about the same pressure by bending more or less without breaking. Take a hickory sapling that is almost impossible to break in its green state, although it may bend double, and thoroughly dry it, and you may easily break it almost "square off," as the boys say. So with almost any kind of timber. Drying makes it stiffer, more unyielding, but in very few instances stronger.

THE EXPLOSION OF DYNAMITE.—If one particle of a mass of dynamite is exploded, the explosion of the rest of the mass is ordinarily supposed to be instantaneous, but it is not quite so. If a lot of dynamite was housed in a continuous train of four miles, it would take a second for it all to explode. Even this is scarcely an appreciable length of time; but if a continuous train of dynamite were poured over the ground between San Francisco and New York City, it would take a quarter of an hour for the explosion to reach from one point to the other. A man, therefore, might sit on the end of the train of powder in New York City and be in perfect safety for 15 minutes after the San Francisco end of the train had begun to explode.

CONDENSED BREATH.—If the condensed breath collected on the cool window-panes of a room where a number of persons have been assembled he turned, a smell of singed hair will show the presence of organic matter; and if the condensed breath be allowed to remain on the windows for a few days, it will be found, on examination by microscope, that it is alive with animalcules. It is the inhalation of air containing such putrescent matter which causes half the sick headaches, which might be avoided by a circulation of fresh air.—*Philadelphia Bulletin*.

SARCOPHAGUS—ITS MEANING.—The ancient Roman and Greek coffin was generally of stone. In some cases it was of a peculiar kind of stone, which was claimed to have the faculty of destroying the entire body, with the exception of the teeth, in 40 days. Hence the name "sarcophagus," literally meaning flesh-eater. The name is still applied to stone coffins only. The "flesh-eating" stone for coffins, as used by the Greeks, was called *lapis Assiis*, or Assian stone, because it was found at Assos, a city of Lydia. The stone is now supposed to have been a species of limestone.

LAKE FORMED BY FLOODING FROM AN ARTESIAN WELL.—The project of flooding a portion of Algeria from the sea has been abandoned, but it seems that large tracts may be covered with water from other sources. De Lesseps reports to the French Academy that a single artesian well bored in 1885 is yielding some 2000 gallons a minute, and has formed a considerable lake 30 feet deep, reclaiming from 1200 to 1500 acres of waste land.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ROLLER-MILL.—*Ledger*, May 21: The roller quartz-mill of the Original Amador mine, at Amador City, was started last Sunday morning. There is a full complement of men at work at the big tunnel at Middle Bar, some working in the upper tunnel, and some in the winze in the big tunnel. The air compressor is not being used, the work at present being done with hand drills. The Dane mill is crushing ore from the Griesback claim in Pioneer district. The condition of the plates indicates a very satisfactory result. Ben Ross has got out about 50 tons of ore from his mine near Volcano, which is estimated to yield fully \$50 per ton. At the Reed & Askey claim near Irishtown, about six miles from Jackson, they have a vein from four to five feet wide, of high-grade rock, which the owners calculate will average \$20 to \$25 per ton. It shows free gold in abundance. The ore is easily extracted at a cost of about \$1 per ton. At the Amador gold mine they are starting another shaft, 400 feet south of the present working shaft. There was an old shaft about 60 feet deep, and this they are cleaning out and repairing, with the intention of sinking it deeper.

SUTTER CREEK.—*Amador Ledger*, May 21: The large hydraulic pump of Knight's patent is in successful operation at the Wildman mine. It is capable of throwing 275 gallons a minute. No further delays are anticipated, and the water is to be taken out to the bottom of the shaft as soon as possible. Preparations are being made to open the Mahoney by taking out the water. Wood is being hauled, and I expect to see the pump working in a few days. The Iowa mine is running along smoothly. The 10 stamps are kept going most of the time. Sam Wearn, the foreman, has put in a self-dumper at the hoisting works—a contrivance of his own, which works remarkably well, and the mine under his management is looking better than for a long period past. The patent dredger was shipped from Knight's foundry this week to Lambing gravel mine, near Lone. It will be in operation in a few days. The enlarging and repairing of the Amador canal in the neighborhood of Bald Rock flume is finished. The capacity of the ditch at this point has been increased nearly 1000 inches. New flume has been put in for a distance of one mile, and the ditch is said to be in better condition than ever before. The steel pipe for the Plymouth line of ditch has all arrived, and a large portion of it has been made. Some 1100 feet will be required.

LIGHTING MILL AND MINE.—*Amador Dispatch*, May 21: We understand that the owners of the Kennedy mine, near this place, are talking of lighting up their mill and mine with electric lights in the near future. The South Spring Hill mine at Amador has been using the electric light for some time, and we understand the result has been very satisfactory to the owners. The one-stamp quartz-mill, formerly used at the St. Julian mine, will be moved to the Sargent mine at Middle Bar, and used to crush ore at that mine hereafter. The rock taken out of the latter mine lately has been very rich, and the indications are that it will soon take rank among our most permanent and paying mines.

Butte.

GULCH MINING.—*Butte Record*, May 23: The amount of snow in the mountains at the present time will enable the miners to do a good summer's work in the gulches and ravines. Quite a number of mines have been located in Kimshaw township, to the east of Chico.

FORBETOWN QUARTZ.—Every few years quartz mining at Forbetsown takes on a new boom, and excitement runs high for quite a period. Pretty soon somebody will strike it, and that pioneer mining district, known in '49 as Toll's diggings, will be found the best quartz-mining section in the State. The *Record* has seen it when it was a lively mining camp.

El Dorado.

GOLD DUST.—*Georgetown Gazette*, May 21: It is estimated that about \$50,000 worth of gold dust is sold at this place and Georgia Slide, during the year. Of this amount the Chinese sell about one-half.

WORK.—*Placerville Democrat*, May 21: Messrs. Combella, Hicks, Papiot and others who are working in the Alderson mine, Cedar ravine, have been putting in a very large amount of work in the claim during the past few months. During the winter they put in 700 feet of tunneling in order to reach the channel and pay-gravel, and had just secured pay-dirt when foul air was encountered in such quantities as to cause them to quit for a time. They are now working an upraise, which is expected to be finished in a few days, when an abundance of fresh air will be secured, and work will again progress in gravel which is known to be good pay. Work was begun upon the Independent mine this week, and will be pushed ahead as rapidly as possible. Messrs. Kern and others have put in the entire winter and spring, so far, running a tunnel in their claim in Cedar ravine, and have at last reached the channel and found rich pay-dirt, which it is expected will yield them large returns. The straightening up of accounts of the men on the Kum Fa and Cedar Ravine mine means a renewal of work in these claims, and work for a number of our miners who have for some time past been idle. Reports from Grizzly Flat indicate prosperous times ahead for the camp. Several new properties have recently been opened up and show very well, while good bodies of mineral have been found in old claims, consequent upon good development work being done. The Big Tunnel scheme in Big canyon now promises to be a success and soon to be in active operation.

Fresno.

HILDRETH NEWS.—*Fine Gold Miner*, May 20: Two important developments have been made in the district during the week. While sinking the shaft at the Hildreth mine, an 18-inch ledge of good ore was opened up, which demonstrates the true course of the Hildreth ledge, showing that, at a depth of 350 feet, the ledge bears southeast and northwest, dipping to the northeast. From develop-

ment, the main body of ore lies east of the working shaft. The company is hoisting ore from the two lower levels from a two-foot ledge. The mill has six weeks of ore to run upon without addition to the dumps. Since work commenced on the Wilson mine a decided improvement has resulted by the ledge widening out to 4 feet between walls. The ore prospects very good. Mr. Wilson is having the ore worked and hauled to Jim Smith's arastra. The sulphurets are being saved on blanket sluices. The McNally Co. is sinking its working shaft, and will run off drifts at each 100-foot level. The mill is working on good ore, with a prospect of an increase of hullion shipments during the month. John M. Wilson states that at the Texas Flat mine the showing is very encouraging for the future. While raising a stope in the tunnel, a body of high-grade ore was opened up, which has stimulated the company to further prospecting. There is a possibility of a mill being put up. Nate Moody, of Hildreth, has bought an interest with Mr. Anderson, on Temperance Flat, in a prospect that is claimed to be a ledge of merit. That successful mining operator from the other side of the mountains, Mike Walsh, has bought an interest, and is now the manager of the Black Hawk mine, which upon its surface prospected so much coarse gold that it caused the adjoining ground for one-half a mile to be located. Good work is being accomplished on this claim. McKenzie & Rule are the owners of the much-talked-of Last Chance mine, which ledge upon the surface crops out for 500 feet along the course of the lode, which they are the owners of, development being done on each claim. But the main prospect is the Last Chance, which is located upon the eastern end of the surface croppings, and is most favorably situated, being located upon the east side and end of the ridge and the north side of the ravine. The main tunnel is in upon the ledge 500 feet, showing a strong ledge of quartz the entire distance, swelling out to seven feet in places, while the average size of the lode is three feet. From this tunnel the amount of stopping ground is considerable. The owners have a 10-stamp mill upon the mine. They have been crushing ore with results that show the good quality of the ore the ledge contains. The Hampton mine, located on Prussian hill, is being worked in ledge matter, and from present indications will soon tap the main ledge. Nevens & Taylor have struck a body of ore in their shaft at the Flemming mine. The above parties have a lease upon the property, which, since development, has opened up a good little mine.

Inyo.

PALMETTO.—*Register*, May 19: A letter from Deep Springs states that the probability is good of a 10-stamp mill being put up at Palmetto this summer. Fifteen tons of ore recently shipped from Sylvania to Reno, yielded over \$1000 clear of expenses, and the owners say they have plenty more for shipment.

Kern.

LONG TOM.—*Kern Co. Californian*, May 20: Probably one of the best, if not the best gold mine in the State, is that of Messrs. Webb and Hirschfeld, at Long Tom, 15 miles as the bird flies from Bakersfield. It has been worked so long and exploited so extensively that it may be said to be of proved permanency. Probably the ore has not been drifted out to an average depth of more than 300 feet, and the shaft, upon which the process of sinking is kept up night and day, has not yet attained a depth of 500 feet. The work thus far done shows that the vein has steadily increased in size with a corresponding rise in the grade of the ore; the best that has yet been found being at the deepest point reached. A mill of 20 stamps is kept running night and day. To supply it with ore is a matter of no difficulty from a vein that averages seven feet in thickness. Messrs. Webb and Hirschfeld say they have ore enough in sight to keep their mill running for two years; but they propose to push the work of further opening the mine without intermission. While beyond a reasonable doubt they have a mine that can be profitably worked for a life-time, they are disposed to take nothing on trust and will strive to learn positively, as soon as possible, just what they possess. The prudence, thrift, and economy practiced at the Long Tom mine are commendable in the highest degree, and if the same had always been the rule in California, gold mining would now be known as a safe and reliable business generally; not as now in exceptional cases only.

Mono.

THE BODIE.—*Miner*, May 23: The east crosscut, 900-foot level, was driven 30 feet; cutting through about three and a half feet of vein upon which we will sink to the 1000-foot level. The north drift from this crosscut was driven 25 feet, showing the ledge 600 feet wide. Upraise No. 1, 1000-foot level, to connect with the winze from the 900-foot level, has reached a height of 14 feet.

STANDARD CON.—Ore shipped to mill for the week, 397 tons. Mill running steadily. Shipments made on Thursday, 19th, valued at \$13,375.42.

THE BULWER CON.—The west crosscut from the north drift, 100-foot level, was driven 20 feet. The north drift, from winze No. 1, was driven 14 feet, showing the vein two feet wide. North drift, 150-foot level, has been extended 10 feet; the vein at this point was one foot wide.

THE MONO.—The west crosscut, No. 2, 800-foot level, was advanced since last report 16 feet.

CON PACIFIC.—North drift has been advanced seven feet. In the face of this drift the ledge is looking well and yielding fair milling ore.

THE ORO.—Work on old Oro ground has been recommenced. It is expected to reach the bottom of the shaft (700 level) in a day or two, when the legitimate work will be begun. We have reason to believe that we shall receive favorable reports from the Oro soon.

Nevada.

AT THE COE.—*Foothill Tidings*, May 20: Work of constructing the necessary buildings at the above-named mine is well under way. A reservoir for the storage of water for motive power is being dug on the summit of the hill, back of the works. This will cover an area of about half an acre, and will be finished in two weeks. Eighteen hundred feet of pipe will be required to bring the water (which will be supplied by the South Yuba Co.) from the reservoir to the mine, and it is now undergoing the process of tarring. The pipe was obtained from the Gold Run Hydraulic Company, and is 24 inches

in diameter. A pressure of over 180 feet will be obtained at the mine, and Pelton wheels will, no doubt, be used. Patsy Ryan is superintending the reservoir work.

DELHI DIVIDEND.—*North San Juan Times*, May 20: The Delhi Mining Co., on the 14th instant, declared a dividend (No. 4) of 10 cents per share on its capital stock, aggregating \$10,000. The Delhi mine is paying handsomely. During the month of April, so we hear, it yielded \$11,000, the expenses of the company for that period being about 10 per cent of the amount. The mill has only 8 stamps. The ledge is 10 feet wide, and heretofore has milled \$20 to the ton; but it has improved lately in richness, and it is thought that it is now yielding \$40 to the ton. As to the permanency of the mine, we think no doubt is now entertained, and it promises to soon have an enduring reputation as one of the foremost mines of the State. The mine is owned exclusively by local parties. The success of the Delhi demonstrates that this part of the county is not lacking in rich mineral resources.

REDUCING FORCE.—*Transcript*, May 22: Another reduction in the number of men employed in the Empire quartz mine at Grass Valley was made Friday. Over 60 have been discharged during the week, most of them being unmarried. It is understood the force will be increased again soon.

DRAIN TUNNEL.—*Grass Valley Union*, May 20: Good progress is being made in opening the drain tunnel of the Brunswick mine, which is found in a better state of repair than was anticipated. Over 500 feet of the tunnel has been put in good condition and retimbered where necessary.

PROVIDENCE.—*Foothill Tidings*, May 23: A month or two ago, the Providence mine, of Nevada City, discharged a large number of men. On Saturday night the remaining force, with the exception of four men, were notified that their services were no longer required.

Placer.

IOWA HILL.—*Placer Herald*, May 21: Our mines are about the same old story; only a few of them, comparatively, are working. The Morning Star is doing well. Watts Bros., at Strawberry Flat, are keeping several men at work. Hobson, at the Blue Wing, keeps a gang on the bedrock. Poorman & Jurgenson, at Wisconsin, or rather Prospect hill, are steadily opening out and developing their mine, and some of these fine days we will hear of shipments of gold from there. McIntire reports favorably from the mine, and is very hopeful of finding the pay streak soon. The quartz mines near Damascus are working quite a number of men, and reports are very favorable. The Mountain Gate, of Damascus, is too well known to require much more than passing notice. Lew Williams says that soon the bullion will be rolling out. Red Point is lively, and the upraise going ahead, and the hopes of all are that they will strike it rich.

Plumas.

PLUMAS EUREKA MINE.—*Greenville Bulletin*, May 20: J. H. Uch, who was over from Quincy last week, says that rich developments have been made in the Plumas Eureka mine; that better ore is now being milled than the company has had for many years. Although the mine has been paying dividends regularly, the people of Plumas will be pleased to know that the owners are to be handsomely rewarded. The mine is operated upon a systematic and economical basis throughout, which is usually the case with English companies.

FINE ORE.—A few days ago we were shown some very rich ore taken from the Drury mine, at the head of North canyon. Gold could be seen in dozens of places. Ore of this grade would certainly produce several hundred dollars per ton. The new wheel for the mill will soon be completed and crushing begun.

San Benito.

THE OIL INDUSTRY.—*Hollister Free Lance*, May 21: A miners' meeting was held on May 12th, in Vallecitos valley, for the purpose of organizing a mining district for the boring of petroleum wells. A set of miners' laws was read and adopted, and Mr. R. Ashurst was elected recorder. The district was named the Vallecitos Petroleum Mining District. Those who organized the district were D. McDonald, president; Chas. Bronson, secretary; R. Ashurst, E. Bowman and Dave Coleman. Since the organization of the district, 12 claims have already been located, and more will be located shortly. The Nevada Company is now thoroughly organized and ready to proceed with the work. Work on the Paulsell claim has recommenced, being under the supervision of Mr. Anderson, a gentleman who understands his business. The well is now down about 100 feet. The Nevada Co. expects to bore a 10-inch well to a depth of 700 or 800 feet before the flow is reached. Old petroleum well-borers pronounce the prospects for oil in the valley to be exceedingly good.

Sierra.

COARSE GOLD.—*Mountain Messenger*, May 21: Rouse & Co., at Deadwood, took out a nice prospect of 19 ounces of coarse gold last week. The boys think they have the deadwood on a rich channel.

SIERRA CITY.—Mr. P. A. Lamping came down from Hog canyon last week. He reports things as looking well up in that country. The Primrose Co. does not intend to crush much rock this summer. The pumps will be set to work and the water got out, after which a tunnel will be run to strike the main chimney, which is thought will take the greater portion of the summer. Last week Mr. Van Trump and F. X. Labonte were up to look after the interest of the Badger Mining Co., between Packer and Upper Salmon lakes. A shaft was sunk and some very rich rock was taken out. The company stopped the shaft on account of having so much water to contend against. A tunnel was started and connection is expected to be made in a few days.

A NEW PROSPECT.—*Sierra Tribune*, May 20: Last Saturday a *Tribune* reporter, in company with Geo. Sharp and Oscar Brown, crossed the Yuba river and visited the American Flag and Banner quartz claim. This mine is situated about one-half mile from town, and was located a couple of weeks ago by H. F. Kynoch and Wood Davis. The parties have already sunk on the ledge about 10 feet, and uncovered a vein three feet in width, with a course of northeast and southwest. The quartz is of an excellent character and prospects exceedingly well in free gold. The owners have graded a place

below the present shaft and will start a tunnel in a short time.

THE TRIUMPH CON.—Dr. J. S. Stone, who visited the Triumph Consolidated quartz mine, near the Keystone, reports it to be a true fissure vein, cutting the country rock in an east and west course and dipping to the north. Also found free-milling ore several hundred feet along the ledge rich in gold. As water can be obtained all the year around for milling purposes, and timber is in abundance, there is no reason why the mine cannot be worked economically.

Trinity.

TRINITY CENTER.—*Cor. Trinity Journal*, May 21: There is not much stir in this section except among quartz prospectors, of whom there are quite a number, and more are arriving daily.

INDIAN CREEK DISTRICT.—*Trinity Journal*, May 21: We learn from Mr. S. J. Hensley, who has just returned from a visit to the quartz mine owned by Hensley, Phillips & Lang, on Spring gulch, in the Indian creek district, that the future prospect for the mine is very flattering. Two men are now working on the ledge and have sunk to a distance of about 50 feet, and in doing so, have taken out about 20 tons of good-looking rock, which will average about \$20 to the ton. When first discovered, the ledge was only three inches in width, but now at a depth of 50 feet, is 16 inches wide, and lies between well-defined walls. For awhile the work will be confined to the development of the ledge, and after a sufficient quantity of quartz is piled on the dump, means will be employed for crushing it.

A NEW MILL FOR NEW RIVER.—*Humboldt Standard*, May 20: A quartz-mill is now in readiness to be packed over the mountains from the east side into the New River mines. It is the property of J. S. Thomson, Harry Smith and Mr. Shulford, and will be put up on Slide creek, just below New River City, where there is ample water to operate it. The owners propose to work ore from the Carrie mine, which lies near the Hard Tack and Ridge-way mines. This mine has a large, well-defined ledge, and the quartz is reported rich. The mill will be packed in just as soon as a train can get over the mountains.

RICH STRIKE.—*Redding Free Press*, May 21: At the Bank of Shasta County can be seen some rich specimens of quartz, taken from a mine at Minersville, Trinity county, owned by Tourtelotte, Smith, and Bauer. Coarse gold seems to be spread all over the surface of the rock, which resembles the quartz taken from the Scherer mine, in fact one can scarcely tell the difference between it and the Scherer rock. The owners have a rich claim.

Ventura.

LEXINGTON CO.—*Ventura Free Press*, May 21: Everything is livelier now than before. Prospectors continue to arrive. Smith & Grover are at work on the Exchange, and have splendid indications. Ralston & Archibald are opening their claim, the Mammoth. Campbell & Foley discovered a rich ledge in Long Dave canyon, and have sunk a 30-foot shaft on the ledge, which yields some of the finest samples of carbonate ores yet discovered in the camp.

NEVADA.

Washoe District.

CALIFORNIA AND VIRGINIA.—*Enterprise*, May 22: On the 1300 level the drift running northeasterly from the north drift from west crosscut No. 1 was advanced 34 feet; total length, 117 feet. On the 1200 level the south drift, entering from the Ophir mine, was extended 30 feet; total length in Con. California and Virginia ground, 150 feet. On the 1400 level west crosscut No. 1 from the south drift was extended 40 feet; total length, 74 feet. Continue extracting ore from the new south stopes as usual. The injection of carbonic acid gas into the bulkhead portion of the mine is still steadily continued. During the week 79½ tons and 860 pounds of ore were shipped to the Morgan mill, 1750 tons and 1740 pounds to the Eureka mill. The average assay value of all the ore worked at both the above mills during the week, according to battery samples, was \$32.83. Bullion of assay value of about \$71,000 is on hand in the assay office. Shipped to San Francisco, May 16th, bullion of the assay value of \$79,751.92.

GOULD AND CURRY.—On the 300 level the main west crosscut was extended 21 feet; total length, 183 feet. At a point in this crosscut, 140 feet west from the upraise, a north drift was advanced 15 feet in quartz. From the upraise in the old stopes, 50 feet above the 300 level, are drifting in various directions and finding some ore. On the 625 level the east crosscut from the main south drift was advanced 29 feet; total length, 272 feet. The face is in hard porphyry. The winze was sunk 18 feet; total depth, 49 feet. The bottom is in quartz and porphyry. Repairs are in progress in the two north compartments of the main shaft.

BEST AND BELCHER.—On the 800 level west crosscut No. 4 was extended 22 feet, making the total length 426 feet. The face is in porphyry and quartz, showing value by assay. On the 1300 level a station is being excavated. On the 1500 level east crosscut No. 1 is stopped. No. 2 was advanced 68 feet; total length, 785 feet. It is passing through porphyry showing clay and fine lines of quartz.

OCCIDENTAL.—In the upper tunnel on the 48 level the south drift from the north incline winze was extended 11 feet; total length, 230 feet. In No. 3 east crosscut the incline winze was sunk 11 feet; total depth on the slope, 85 feet. From the winze and the south drift extracted 24 tons of ore.

MEXICAN AND UNION CON.—On the 1300 level the joint Union and Mexican drift running northeasterly, was extended 25 feet. This drift is now 560 feet in Mexican ground. The joint Mexican and Ophir east crosscut was extended 22 feet; total length, 455 feet.

SIERRA NEVADA.—On the 520 level west crosscut No. 9, from the north lateral drift No. 2, 160 feet south from west crosscut No. 1, was extended 58 feet; total length, 341 feet. The face is in porphyry, quartz and clay.

UTAH.—On the 472 level the north drift from the main west drift was extended 40 feet; total length, 705 feet. The face continues in vein porphyry,

passing through clay slips, and is showing moisture.

OPHIR.—On the 1300 level, north winze No. 1 was sunk nine feet. It is showing low-grade ore in the bottom and old stope timbers of the east side.

Aurora District.

PROSPECTS.—*Esmeralda News*, May 21: Aurora, once a scene of excitement and prosperity, is about to resume its former place in the catalogue of bullion-producing camps. For years it produced annually millions upon millions of gold. The place, on account of the merit of its mines, was known and heard of everywhere, but owing to the unsettled state of titles to mining property at that period, involving disputes, the camp received a set-back which it has taken time to efface. Now that transportation facilities to and from Aurora are more convenient, the titles to the mines settled by possession considered valid and by patents issued to owners by the United States, together with the intrinsic value of the mines of that district, an era of prosperity is assured. The hills and mountains surrounding the pleasant town of Aurora abound in veins of gold and silver ore of all grades; in fact there are quantities, beyond estimate, of free-milling gold ore which can and will be worked to a profit. Aurora continues to merit its old reputation for rich and highly productive mines in gold and silver. The owners of the Silver Lining are jubilant over the prospects of their claim. The quantity of ore in sight in the Silver Lining is so great as to render it beyond calculation. The company tried to obtain a lease of the Silver Hill mill, but was unsuccessful, and now has commenced the grading for a 10-stamp mill at Gregory Flat. Last Wednesday, John W. Gray, superintendent of the Silver Lining, came down from Aurora on his way to San Francisco to meet his company, relative to the more extensive operation of the mine and the erection of a mill. It is thought that the company will remove a mill from Bodie and place it at the Gregory Flat site. The litigation which has prevented operations on the Prospectus and Eighty-five lodes being almost settled, it is confidently expected that ex-Governor Blaisdel will have these mines extensively worked.

Como District.

STRUCK THE LEDGE.—*Virginia Enterprise*, May 22: The ledge on the 200 level of the Como-Eureka mine, at Como, has been struck. It is on an average four feet in width, and some of the finest-looking rock ever taken from that mine is now being hoisted. The company will start the mill the first of next week, and will run through about 10 tons per day.

Eureka District.

ORE.—*Eureka Sentinel*, May 21: Some fine-looking ore is being sent to the furnaces from the Alexandria mine. Joe De Jou has struck ore in the Whip-Poor-Will mine, on Prospect mountain, that assays \$240 per ton. The Silver Lick mine is still panning out high-grade ore. This mine is one of the "old reliable" kind. Mitch Gregovich and Mike Murphy, who have been running a tunnel in the Ozark mine, on Prospect mountain, have struck a hozy of ore. It was rumored on the street yesterday that the contractors in the Ruby Hill tunnel had struck a vein of very good ore. The Rescue mine at Silverado has been leased to Jerry McMahon & Co. for one year. The lessees are excellent miners, and will no doubt make money out of their new venture.

ORE SHIPMENTS.—*Sentinel*, May 22: During the past week ore shipments were made from the mines of the district to the Richmond works: Adelphi mine, 6 tons; White Pine, 5 tons; Rescue, 24 tons; May, 7 tons; Jackson, 43 tons; Volk, 2 tons; Bay State, 27 tons; Roslin, 7 tons; Members, 8 tons; Geddes & Bertrand, 16 tons; Silver Lick, 10 tons. Eureka Con., Ruby Dunderberg mine, 75½ tons; Rives & Berry, 29½ tons; Morey, 1 ton; Summit, 13½ tons; Hamburg, 32½ tons.

Gold Run District.

PLACERS.—*Silver State*, May 24: Judge Bonfield and Paul Pison have the ditch completed to their placer mines in Gold Run district, and have commenced washing for gold. They think the diggings will average from \$2.50 to \$4, and possibly more, per day, and they want to give white men a chance to work them so long as the water lasts. The dust is fine but round and resembles that produced in many parts of California in early days. They have been to considerable expense building a ditch, but they think they will get their money back next winter when water is plenty.

Philadelphia District.

SILVER.—*Belmont Courier*, May 22: Green Aldrich has discovered rich ore in his claim, adjoining James Laity's claim, in East Belmont. The discoveries made in Laity's and Aldrich's claims show that rich silver ore can be found in Philadelphia district by prospecting for it.

Red Canyon District.

GOLD.—*Virginia Enterprise*, May 22: A Comstock, who has been taking a look at the Red Canyon gold mines, speaks well of them, and has some notion of returning and prospecting for a month or two. Five or six mines are now being worked with very good results.

Revelle District.

BULLION.—*Belmont Courier*, May 22: The Revelle mines are looking well, and the Gila mill is now crushing the ores extracted from the mines of that district. The Norris Bros. shipped a bar of bullion on Wednesday last, and regular weekly shipments will be made from now on. The Clarke furnace will be completed in a short time.

Sprucemont District.

LIVELY.—*Belmont Courier*, May 22: Sprucemont is about the liveliest camp in Eastern Nevada just now. The big smelter is running, and nearly 200 men are engaged in the district.

Tybo District.

PRODUCING.—*Belmont Courier*, May 22: There are about 35 men at present in Tybo, the majority of whom are engaged in mining. The mines are producing ore in good quantities, which is being hauled to the mill for reduction.

Tuscarora District.

BELLE ISLE.—*Times-Review*, May 21: Crosscut east, 250-foot level, has been advanced five feet; rock very hard.

NORTH BELLE ISLE.—The north gangway from the south end line has been extended 21 feet.

Quite an increase in the flow of water is noticeable in the past few days.

NAVAJO.—Fair progress has been made with the work on the 350-foot level. The south drift from the Johnston crosscut has been extended 11 feet.

NEVADA QUEEN.—During the week the shaft has been sunk 14 feet. Water not strong, only 10 tanks per hour. North gangway has been extended 40 feet; rock is changing to hard blasting; water seeping through the face. Seventy-foot level has been advanced 11 feet. This drift has to be timbered. Machinery is running nicely.

ARIZONA.

MOHAVE COUNTY.—*Miner*, May 21: Stopping is now going on at the American Flag, and the ore now coming out is better than ever. The sampling works people shipped four carloads of ore from Prescott to the smelter last week. The parties who are running the jiggers on the American Flag dumps are making money hand over fist. The C. O. D. sent down their regular carload this week, which ran higher than any yet taken from the mine. The Illinois mine belonging to the estate of Ormsbee Groom, deceased, has been sold to Ed F. Thompson. Frank Robinson brought in a lot of gold ore from some new locations in the Weaver district, which went very well. Dave Parks is running a sawmill on the American Flag mine, and getting out a lot of timbers and slabs for use in the mine. Messrs. Fogarty & Morrissey, who have leases on mines in the Todd basin, both had small lots of ore worked during the week. J. J. Jerome is in town from Cedar district, and tells us that teams will be in this morning with a lot of ore from the Arnold mine. Ike Conkey and Anson Smith are prospecting in the Wallapai mountains, and have sent in word that they have struck the biggest thing in the country. Beecher & Co. received a lot of leaching tanks yesterday for O'Brien & Meara, who are going into the leaching business in the Weaver district near El Dorado canyon. Jack White has made a big strike on the Democrat mine at Wallapai mountain, which consists of a six-inch streak of ore averaging about \$350. The Democrat is the south extension of the Antelope mine. J. F. Maher, who is concentrating the dumps of the American Flag mine by means of jiggers of his own contrivance, sent down his first lot of concentrations last week. On the Greenhorn mine, at Wallapai mountain, Messrs. Allyn, Sherman & Co. are taking out more and richer ore than ever. They have now about 14 to 18 inches of pay streak, in which is a small streak of about an inch, which is the pure stuff, and can be whittled with a knife as easily as a piece of pine.

A NEW STRIKE.—*Phoenix Herald*, May 20: The elated of the Phoenix mine strike has been succeeded by one that bids fair to bring Cave Creek district to the front as a rich camp. The Gray Bros., who own the Golden Chief mine, resumed work some two months ago, and at a depth of 55 feet came into a fine body of sand-carbonate ore that has held out up to the present time, at a depth of 90 feet the ore filling the waist of the shaft, and how much more in the south wall has yet to be determined by cross-cutting. The average assays from the recent tests run from 35 to 100 in gold, and from 30 to 60 in silver. The mine is well situated, being at the base of the Apache Spring mountains, facing the desert of the Winnefred, where is located the Union and Scarlet, both promising gold mines, now operated by a St. Louis company which has proved its property good by a shaft 400 feet in depth and several hundred feet of drifting. The sand-carbonate ore of the Chief, however, being in the district a new character of ore, resembles the ores of Tombstone, in the Contention, Tough Nut, and Head Center mines. The new railroad crosses the south end of this mine, it being two miles from Cave creek, westerly. Its situation makes it an easy mine to work, the country being almost a dead level and wood and water plenty.

TOMBSTONE NOTES.—*Democrat*, May 22: The Grand Central shaft is timbered down 60 feet, and the sinking is progressing. The excavation is completed for the hoisting engines. The Girard-Dipper shaft is down and timbered to a depth of 205 feet. Drifting on the ledge has been discontinued for the present. The Boss looks fair and promising. The station on the 300-foot level is about finished, and the coming week will see drifts started north and south on the ledge. The Silver Thread continues to yield well. The output for this month will probably exceed \$12,000, which is fair for a small mine. The Chance shaft is down 216 feet. The rich ore at 70 feet continues to hold out as good as ever. This is one of the most promising little mines in the district. An engine will soon be erected on the Jonathan, and the incline opened up into a double compartment shaft. The Maine looks well in the upper stopes and somewhat more satisfactory in the drifts on the 500-foot level. The boys at the Mamie continue to find chloriding a most profitable pursuit. It will be fully a month before the pump is in place at the West Side. The mill will then start up and work will be resumed at the mines.

COLORADO.

REDWELL BASIN.—*Elk Mountain Pilot*, May 20: A trip to Redwell Basin last Saturday satisfies us that the trail will be open for pack-animals about the 5th of June. The tunnel being driven to tap the Daisy group of claims, and particularly the Daisy lode, has now reached a depth of 370 feet and is still being pushed ahead. They expect to run at least 50 feet further before reaching the vein. The Yellow Jacket lode, in Redwell Basin, is being worked by the owners, Dunbar Bros. The claim is developed by a tunnel on the vein 75 feet long, which is still being driven ahead. The ore is iron, copper, and galena; principally the latter, and is of a very fair grade. The Bullion Prince, in Redwell Basin, and owned by Wiltsee, Stevens, and Riggs, is now being worked by the latter. The lode is developed by two tunnels, one 30 feet in length and the other 112 feet. The latter, which is lower down the hill, cuts the vein at 65 feet, and from thence continues on the vein, which averages about six feet wide. Along the hanging-wall is a body of ore that Mr. Riggs styles hard carbonates. On the foot-wall is a body of ore of similar characteristics, only quite soft. It is in the lower tunnel that work is now being carried on. The Bullion King shipped a car of ore to Gunnison this week.

IDAHO.

BULLION.—*Cœur d'Alene Record*, May 14: Sunday, Assayer Lougee melted the product of 10 tons of Mother Lode quartz, crushed by the arastra, and obtained a bar of fine gold bullion weighing between 32 and 33 ounces and valued at about \$570. Supt. Coulter, of the Cœur d'Alene Water & Mining Co., expects to begin hydraulic work at the Raven placers early next week. A strike of lead ore was made on Old Baldy a few days ago, on the east or north fork of Eagle creek, below the Golden Dawn and Ocean groups. Development may bring to light a big ledge of galena. Frank Reed has had the flume and tail-race of the Chapman arastra, opposite the mouth of Drenn gulch, cleaned out preparatory to starting it up on "Jim Blaine" ore next Sunday or Monday. Men are now at work building a road up Dream gulch to the new discovery, which is a chimney of very rich gold ore within the Jim Blaine lines, south of the Homestake, and about 300 feet above the Buckeye. The find was made ten days ago, about 100 feet from where Mr. Reed first found float in 1883. A tunnel has been run in 20 feet and now shows four feet of solid ore in the face, which is said to fairly bristle with free gold. The ledge is the same as the Homestake and runs parallel with the Buckeye. The ore will be roasted at the mine and then hauled down to the arastra in wagons.

WOOD RIVER.—*Ketchum Keystone*, May 21: A number of new faces now daily appear on the streets. Many are those of miners who are returning after an absence during the winter, while others are here looking up mining interests and opportunities for investment. Wood River and her wonderful mineral resources have of late attracted general attention, and the continued improvement in several of the leading mines has impressed many with the fact that a better field for investment in mines could not be found. The ores of the Minnie Moore and Idahoan mine have been contracted for by the Omaha Smelting Works. The Queen of the Hills had a contract to deliver 1000 tons at Omaha, but did not succeed in making a contract for the output of the season. It is stated that the ore from the mine is now being sent to the Selby Works in California.

THE WEST FORK.—Those who remember the rich strike made in 1881, at the West Fork mine, and the large body of high-grade ore then taken out, are not a little interested in the report current now of another strike having been made in the same mine within the past few days. Work has been steadily carried on, and while as yet the new ore body found is of no considerable size, it is sufficient to give prospects of a large bunch being found, and in any event will lead to a vigorous prospecting of the property. This is the first ore found in the mine in over five years, during which time thousands of dollars have been expended in development work, carried on unremittently at times when the outlook would have disheartened the most of men called upon to furnish the means to prosecute the work. Additional men were put to work during the week, and the latest authentic report from the mine was that the body of ore was gradually increasing in width.

AT THE SAMPLER.—Workmen are engaged in building an addition to the sampling-mill, the enlargement being necessary to accommodate the new machinery soon to be put up, and the increase of business. The west end of the mill will be extended 20 feet and an office and plate-room will be put in the space between the track and building. The Cornish roll and automatic machinery is expected to arrive here next month. The receipts at the sampler during the week were light, embracing about 18 tons from the Elkhorn mine and 10 tons of Independence ore. A lot of ore from the Allen group of mines is also expected to-day.

A NEW GOLD BELT CLAIM.—*Wood River Times*, May 18: S. S. Cass to-day brought in some samples of horn silver ore, which he extracted from his ledge out on Rock creek. They came from the Gleaneriff, a new claim, which he and Dan Twobill located a short time ago, on what is supposed to be an extension of either the Donovan or the Ohio and Ornament ledge. A shaft is down on the ledge 20 feet, and shows the vein to be five feet between walls—of which five inches is black sulphurets and horn silver, which assays \$1300 per ton, and 14 inches is ore going 100 to 150 ounces silver per ton. The Gleaneriff is owned by S. S. Cass and Dan Twobill, of this city, who propose to push developments as rapidly as possible.

MOTHER LODE.—The lower tunnel on the Mother Lode, at the water-level where the famous slab lies, is in about 75 feet, the first one above it about 120 and the second above about 130, an aggregate of 325 feet. A connection is now being made between the second and third tunnels, near the face of the former. The ore continues as rich as ever, and the ledge widens gradually as depth is attained. Several men are employed in one of the upper tunnels of the Idaho; a few are working at the mill, and a small force is engaged in clearing out the lower tunnel, below the mill, the mouth of which caved in a few weeks ago.

THE SHIPPING SEASON.—*Wood River Times*, May 18: The shipping season opens this year, in this region, with a more promising outlook than ever before. The Minnie Moore, Queen of the Hills, Relief, Commodore, Climax, Idahoan, Eureka, Carrie Leonard, Silver Star, King of the West, Galore, Tyranniss, Emery, Bullwhacker, Nay Aug, Montana, Snow-Fly, North Star, Triumph group, and the large number of other producing mines will all increase their yield, and where tons have been shipped heretofore, carloads will now be marketed. Before the close of the season it is probable that the daily shipments of ore and bullion from our galena mines will average 10 carloads.

EAST FORK OF WOOD RIVER.—Ole Oleson, who has been developing the S. J. Friedman Lucia claim, on one of the tributaries of the east fork of Wood River, says that, from present appearances, fully 100 men will find employment on the east fork this year, and that in a year or two, unless he is greatly mistaken, that region will be one of the most important on Wood River. The Lucia vein is showing up encouragingly. The workings so far have developed a vein averaging six inches of ore, worth an average of 100 ounces per ton.

FLINT.—*Idaho Avalanche*, May 21: We understand that a large ledge of very rich ore has been found in the Perseverance mine, at Flint, some of

which runs up into the thousands in assay value. This rich ore was found in the bottom of the shaft on that lode. Rich ore has also been found in the Rising Star lode, some of which assays \$6000 per ton. Good ore is also being found in other lodes in that camp, owned by individuals. From present appearances, Flint has a bright future. Messrs. John F. Sullivan and Isaac Phillips have discovered a large quartz lode several hundred feet west of the Black Jack, which contains fine milling ore in large quantities. The lode has just been discovered, and as yet but little is known about it, except that it is large and the ore good. The Idle Wild mine, on War Eagle mountain, never looked better than at the present time. The shaft is 250 feet deep, from the bottom of which levels have been run in good ore.

MONTANA.

STRIKE.—*Anaconda Review*, May 20: In regard to the strike in the Katy Darling mine, which was reported in this paper last week, there have been no further developments. The rich vein of ore, which was struck, is about eight inches in width, and apparently leads directly into a large body of ore. The owners of the mine are feeling pretty lucky. From C. H. Moore, superintendent of the Pyrenees mine, we learn that the Pyrenees mine and mill are now running full blast. There are 35 men on the pay-roll, and the mine looks better every day. The Southern Cross mine, at Georgetown, owned by Salton Cameron, is being worked by A. Wartenweiler and H. Bratnoher, under a six-months' bond, which will expire next month. They have a number of men at work on the property. Four men are now at work in the Luxembourg, owned by Salton Cameron. This claim adjoins the Pyrenees on the side where that mine is growing richer. Parties down from Phillipsburg report all the mines in that district running at full blast, and that the whole camp is on the boom. Snow has fallen heavily in the past two weeks, however, and this interferes with the operations of prospectors and small mine-owners. In conversation with a representative of the *Review* a short time since, a prominent mining man of Butte said he considered the mineral belt, just back of Anaconda, as the most promising country in Montana. He even went so far as to state that he believed the time would come when these mines would be of more importance to the town of Anaconda than the great smelter. While this view is probably a little too rosy, the statement is still within the range of possibility. The developments of this mineral belt this summer will be a great surprise to all but the very few who are posted. Mining operations at Silver Lake are still impeded by the heavy snow.

OREGON.

ALTHOUSE MINES.—*Rogue River Courier*, May 20: Richardson & Gilmore have cleaned up and ceased operations for the year. Barnett & Dickey cleaned up their winter's run and went over to their summer diggings on Indian creek, where they will work during the dry season. Jas. Turnbull has struck good pay in his tunnel on Althouse. He was running a drift to strike an old channel, and after a long time has succeeded, and is well rewarded for his expense and delay.

UTAH.

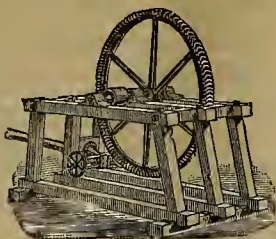
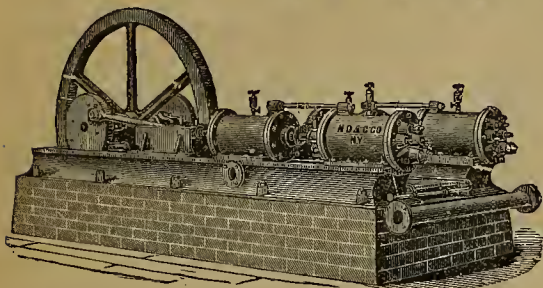
FRISCO.—*Southern Utah Times*, May 19: The Horn Silver shipped four cars of ore this week. George Hardy shipped a carload of matte last week. The Grampian is improving as developments are being made. Charles Lammersdorf's surface mine is being worked on a limited scale while silver is so low. J. H. Hedge's great sulphur mines are, without doubt, the richest in the country, and offer a fine field for profitable investment. Grace & Lipscomb, in the development of their mine 18 miles south, encounter some pieces of fabulously rich Horn Silver ore. Kruse Bros., Poudler & Kaas, are now down 150 feet on their mine, two miles north of Camp. They have encountered ore, and the prospects are promising for the uncovering of a paying mine. There is some talk, on the outside, of the Horn Silver Co. sinking a shaft on its north extension. We hope this will be done, as it would tend to give a new impetus to mining in this district. We doubt, however, if the present star-chamber management will ever do so sensible a thing.

STOCKTON DISTRICT.—*Cor. Salt Lake Tribune*, May 22: The mines about Stockton never looked better than now, and yet there is so much undeveloped ground that it is not unreasonable to predict a great future for the camp. Ophir district can be reported as only partially active. Men who have long been with the camp and have good claims only partially developed are doing what their limited means permit, and hold on with a strong faith of final success. On Lion Hill the Brim Bros. are working several claims and are making small shipments of ore. They speak of a concentrator as one of the great needs of the camp, and they may put one in for their own ores, and to do custom work. Mr. Lineback has a good property in the foothills near the mouth of Ophir gulch, from which he makes small shipments of high-grade ore. On Lion Hill there are large ledges of ore carrying silver and gold in pyrites, which would pay if cheaply roasted and used in connection with ores needing this class of fluxing material. About all the claims around Ophir are being represented from year to year, and that is about the extent of the work done on most of them.

REVIEW.—*Salt Lake Tribune*, May 20: The receipts in this city for the week ending the 18th instant, inclusive, were \$115,550 in ore and \$69,882.34 in bullion, a total of \$185,432.34. For the previous week the receipts were \$109,804.82, of which \$60,250 was ore, and \$49,554.82 was bullion. The Ontario product for the week was silver bullion, 23,112.67 fine ounces; ore sales, \$31,698.17; a total of \$54,810.84, approximately. All is going on as usual with this immense property. The Daly output for the week was seven bars bullion, 10,477.10 fine ounces; no ore sales. Fine bar receipts for the week were to the value of \$10,500; base bullion, \$7200. The product of the Hanauer smelter was for the week, \$33,900 in bullion. The Horn Silver of Frisco is shipping some lots of ore from time to time, but the public can get no idea of the value of it. Ore receipts in this city for the week were to the value of \$37,700 by Wells, Fargo & Co., and \$77,850 by McCornick & Co., including \$2050 Crescent,

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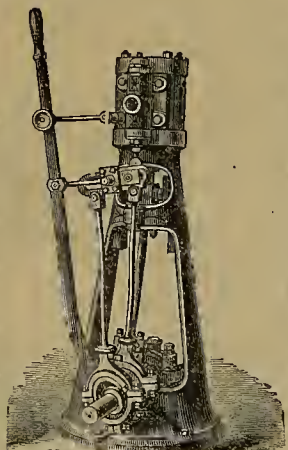
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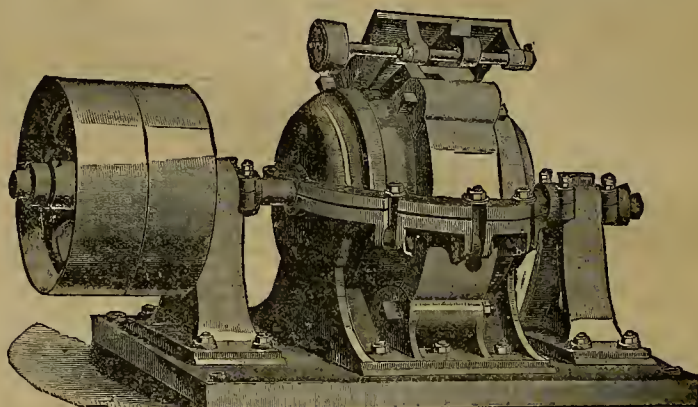
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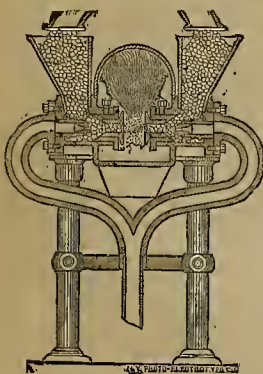
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ESTABLISHED 1869

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

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(Formerly Hubn & Luckhardt,)

Mining Engineers and Metallurgists.

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Corner of Leldesdorf Street, - SAN FRANCISCO

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proved processes.

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SAW MILLS AND MACHINERY
Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

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Gauge, 20 inches; height, 5 feet 6 inches; width, 4 feet; weight (fully watered and coaled), 8 tons. Also one extra set wheels, tools, 30-pound iron rails, etc.

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HAVE PROVED THE MOST ECONOMICAL AND SUCCESSFUL
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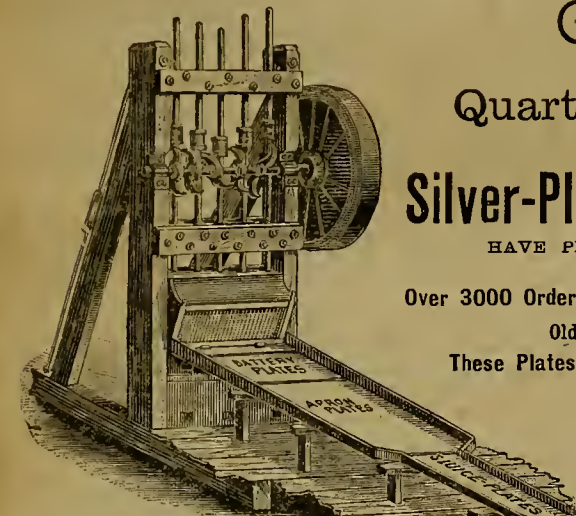
These Plates can also be purchased of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine Street.

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Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case. Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

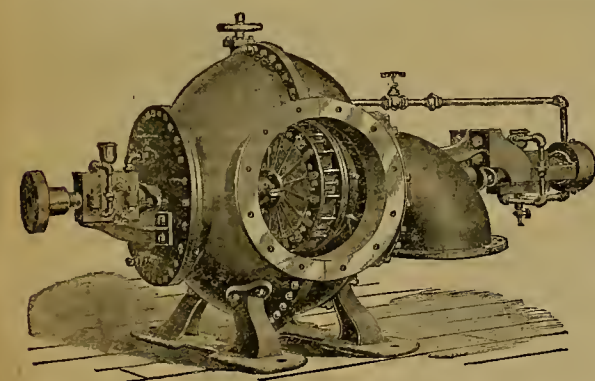
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1858.

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San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tanned Manila Rope, Hay Rope, Whal Line, etc., etc.

Extra sizes and lengths made to order on short notice

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611 and 619 Front St., San Francisco.

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CHEMICAL LABORATORY,

BULLION ROOMS and ORE FLOORS,

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COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

List of U. S. Patents for Pacific Coast Inventors.

From the official report of U. S. Patents in DREW & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING MAY 17, 1887.

- 363,194.—LIFTING JACK—A. K. Bagwell, Plainburg, Cal.
363,198.—GOLD-WASHER—H. G. Blodgett, Harrisburg, Ogn.
363,060.—SAFETY SIGHT-FEED REFLECTOR—W. S. Getchell, Oakland, Cal.
363,168.—WHEELBARROW—J. Peterson, S. F.
363,020.—RAILWAY TIE—Luke Taylor, Butte creek, Ogn.
363,095.—BALING PRESS AND FEEDER—Thompson & Isham, S. F.
363,264.—FURNACE—E. W. Tucker, Honolulu, H. I.
363,101.—DERRICK—J. B. Wallace, Walla Walla, W. T.
363,008.—HASP LOCK—John Shaw, Browns, W. T.
- NOTE.—Copies of U. S. and Foreign Patents furnished by DREW & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Mining Share Market.

Stocks have not held up so well this week as was expected from the advance of last week. Insiders, however, expected this drop, and say there will be another slight rise before a regular excitement sets in.

In speaking of what it calls "the boom to come," the Virginia Enterprise says: We shall not only have the old bonanzas and the north end, but the middle mines will also stand in good and strong. The Chollar and Potosi will make things lively when they begin hoisting and milling ore. At the Chollar they are prospecting on the 100, 250, 350 and 450 levels. On these levels they are now running no fewer than ten exploring drifts and crosscuts. In these they are now opening up some fine deposits of ore. The ore taken out in making these explorations is stowed away in the openings below, only enough being dug down to show the extent and value of the deposits cut into.

An important connection soon to be made will be that between the 450 level of the Sharon shaft, at the croppings of the vein, and the 450 station of the old Chollar shaft. The drifts between these points will soon meet. The connection will not only afford a fine circulation of air, but will also give valuable working and prospecting facilities.

At the Savage next week will be opened a new working station at the 700 level. The winze from the 600 to the 700 yesterday had only 10 feet to go to the point where the station is to be made.

A very important connection has just been made between the north drift on the 1200 level of the Norcross and the ninth station (1200 level) of the Savage. The draft of air is down the Norcross and up the Savage shaft, and is almost strong enough to blow a lantern out of a man's hand. This drift is a large one and is fast cooling off all the middle mines.

On the 1300 level of the Chollar, in December last, in an east crosscut, a body of first-class milling ore was cut into a distance of eight feet, when work was discontinued. The width of this deposit is unknown. Now that the big drift is cooling off, all this part of the mine work at this point might economically be resumed and the deposit fully explored.

The lack of the connection just completed was the last thing in the way to the full and perfect exploration of a very large area of virgin ground that has long been lying untouched in the middle mines. They may now prospect all the way through from mine to mine, and it is expected that the work will soon be commenced.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court Department to, San Francisco:

LONE STAR G. M. Co., May 21. Location, El Dorado Co. Capital stock, \$5,000,000. Directors, J. C. Heald, Geo. W. Miller, M. H. Gibson, G. Rich and G. W. Bibbens.

NEWARK G. M. Co., May 21. Location, Cal. Capital stock, \$400,000. Directors, T. E. Jewell, E. M. Smith, W. Holt, D. B. Arthur and W. B. Murdoch.

MONTEZUMA G. M. Co., May 21. Location, El Dorado Co. Capital stock, \$5,000,000. Directors, J. C. Heald, Geo. W. Miller, M. H. Gibson, G. Rich and G. W. Bibbens.

UNION PAPER CO., May 21. Capital stock, \$10,000. Directors, M. P. Vandewater, W. D. Witham, A. G. Towne, J. E. Watson and C. Maginnis.

BORLAND KILN CO., May 20. Object is to purchase, own and operate patents for a hot-air, automatic grain and malt-dryer. Capital stock, \$75,000. Directors, Louis Borland, Thomas J. Parsons, Geo. Cottrell, F. J. Meckfessel and Frederick Meckfessel.

AMERICAN BISCUIT CO., May 20. Capital stock, \$1,000,000. Directors, Louis Sloss, Lewis Gersile, Isaac Wormser, Thos. Jennings, Isaac Trumbo and James Moffitt.

ROCKLAND LIME & LUMBER CO., May 20. Capital stock, \$100,000. Directors, Jas. S. Hanly, Wm. H. Goodell, Louis S. Snow, James F. Chapman and Francis Cobb.

FORTY-NINERS' HOPE M. & M. Co., May 20. Location, California. Capital stock, \$100,000. The directors are Charles Hinsberg, F. H. Busby, G. W. F. Cook, E. H. Rhodes and Wm. Grant.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

MINING AND SCIENTIFIC PRESS.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.					
COMPANY.	LOCATION.	NO. AMT.	LEVIED.	DELINQ'T.	SALE.
Almont M Co.	Arizona.	1.	05.	Mar 30.	May 7.
Confidence S M Co	Nevada.	14.	50.	Apr 7.	May 12.
Central California Jit Co.	California.	4.	1.00.	Apr 27.	June 6.
Crocker M Co.	California.	4.	16.	May 19.	June 22.
Champion M Co.	California.	24.	10.	Apr 19.	May 21.
Europa M Co.	Nevada.	9.	25.	Apr 5.	May 12.
Gray Eagle M Co.	California.	2.	01.	May 17.	June 22.
Golden Piece M Co.	California.	9.	10.00.	Apr 26.	June 3.
Habert Concentrator Co.	California.	2.	10.	May 10.	June 18.
Heath M Co.	Idaho.	1.	15.	May 20.	June 25.
Julia Con M Co.	Nevada.	22.	15.	Apr 18.	May 24.
Mono M Co.	California.	23.	50.	Mar 31.	May 6.
Mountain Tunnel M Co.	California.	4.	05.	Apr 14.	May 23.
Morning Star M Co.	California.	2.	12.	Apr 16.	June 13.
New Coast M Co.	California.	2.	10.	Apr 19.	June 13.
Phil Sheridan M Co.	Nevada.	1.	10.	Apr 16.	May 25.
Sierra Nevada S M Co.	Nevada.	38.	25.	Apr 13.	May 18.
Scorpion S M Co.	Nevada.	21.	10.	Apr 27.	June 3.
Trojan M Co.	Nevada.	15.	10.	Apr 23.	June 3.
Venus M Co.	California.	1.	10.	Apr 20.	June 17.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Crown Point M Co.	Nevada.	J. Newland.	329 Pine St.	Annual.	June 6
Caladonia M Co.	California.	W. L. Oliver.	328 Montgomery St.	Annual.	June 4
Euro-American M Co.	Nevada.	T. W. Nowlin.	230 Montgomery St.	Annual.	June 4
Gagner & S M Co.	California.	G. Wilson.	126 Kearny St.	Annual.	June 7
Goodshaw M Co.	California.	C. O. Harvey.	339 California St.	Annual.	June 7
Mides & S M Co.	Nevada.	T. W. Nowlin.	230 Montgomery St.	Annual.	May 28
Morning Star M Co.	California.	T. W. Nowlin.	230 Montgomery St.	Annual.	June 7
San Francisco Copper M Co.	California.	F. E. Berier.	320 Sansome St.	Special.	June 7
Trinity River & H M Co.	California.	J. T. Greary.	318 Pine St.	Annual.	June 6

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50.	July 1
Derbec Blue Gravel M Co.	California.	T. Wetzel.	622 Montgomery St.	10.	May 19
Original Hidden Treasure.	Nevada.	D. A. Jennings.	401 California St.	13.	Apr 4
Plymouth Con M Co.	California.	—	New York.	25.	Apr 4
Pacific Borax, Salt & Soda Co.	California.	A. H. Oliver.	432 California St.	10.	Apr 7
Paradise Valley M Co.	Nevada.	W. Leta Oliver.	328 Montgomery St.	25.	May 15
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	May 15

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, May 26, 1887.	
ANTIMONY—French Star.	71 @ 27.00
IRON—Glenbrook too.	— @ 27.00
Eglinton, ton.	— @ 25.50
America Soft, No. 1, ton.	— @ 28.00
Oregon Pilot, ton.	21 @ 23.00
Clippert Gap, Nos. 1 & 4.	22 @ 23.00
Old Lady, ton.	22 @ 23.00
Shotta, No. 1.	28 @ 20.00
COPPER—	
Bolt.	19 @ 21
Sheathing.	18 @ 21
Ingot.	12 @ 13
Fire Box Sheets.	— @ 21
LEAD—Pig.	— @ 5.00
Bar.	6 @ 5.60
Sheet.	— @ 5.00
Shot, discount 10% on 800 bag.	1 @ 80.00
Buck, 3 lbs.	2 @ 20.00
Chilled, do.	2 @ 20.00
QUICKSILVER—By the flask.	40 @ 00.00
Flasks, new.	1 @ 85.00
Flasks, old.	1 @ 85.00
STEELE—English, lb.	16 @ 25
Black Diamond, ordinary sizes.	8 @ 16
Flow.	3 @ 6
Machinery.	3 @ 6
Naylor & Co.	10 @ 14

New York Metal Market.

Telegraphic advices dated May 26th give the following New York prices:
BAR SILVER—91 3/4 per oz.
SILVER—64 @ 64c.
COPPER—LARS—\$10 40.
IRON—No. 1, \$22.00.
LEAD—\$4.30 @ 4.35.
QUICKSILVER—63 @ 64c.

The following is the latest by mail from the "New York Metal Exchange Market Report":
COPPER—Steady, spot, closing at \$9.96 @ 10.00. Transferable Notices (Chili Bars) issued at \$9.96 @ —. Transferable Notices (Chili Bars) issued at \$20.65.

LEAD—Firm at \$4.45 @ 4.50. Transferable Notices issued at \$4.74.
TIN—Quiet at \$22.70 @ 22.90. Transferable notices issued at \$23.30.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.
Australian Tin, \$22.90 @ 23.25; Billiton Tin, \$23.60 @ 24.00; Banca Tin, \$23.60 @ 24.00; Baltimore Copper, \$9.96 @ 9.98; Orford Copper, \$9.90 @ 9.95; P. S. C. Copper, \$10.00 @ 10.25; Foreign Lead, \$4.45 @ 4.70; Foreign Spelter, \$4.70 @ 4.75; Antimony, \$7.60 @ 7.70.

MAKERS' PRICES—At tidewater. 100-ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$20.50 @ 21.00; No. 2, \$19.50 @ 20.00; Gray Forge, \$17.50 @ 18.00; Hudson River, Grade No. 1, \$20.50 @ 21.00; No. 2, \$20.00 @ 21.00; Gray Forge, \$17.50 @ 18.00; No. 2, \$21.00 @ —; Gray Forge, — @ —.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.

G. W. INGLETS—Arizona.

ORO, McDOWELL—Venture and Santa Barbara Cos.

J. L. DODGE—Alameda Co.

W. J. FARMAN—California and Nevada.

SILAS PAUDEN—Colusa Co.

WILLIAM POOL—Fresno Co.

M. S. PRIME—Alameda Co.

R. O. HUSTON—Butte, Montana.

 E. P. SMITH—Humboldt Co. | || S. J. LITTLEFIELD—San Diego Co. | |
| EDMUND WRIGHT—Shasta Co. | |

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Con. Virginia and California, May 21, \$79,751;

Mt. Diablo, 20, \$56,077; Lexington, 20, \$31,776;

Silver Bow, 21, \$31,195; Moulton, 20, \$13,640;

Bluebird, 20, \$20,272; First National, 20, \$16,648;

Alice, 20, \$32,784; Marget Ann, 19, \$64,488;

18, \$55,601; 19, \$55,550; Bannock, 19, \$13,000; Hanauer,

19, \$49,251; 21, \$23,200; 22, \$47,000.

Anderson Springs.

We have seen hundreds of guests at this well-reputed resort who have benefited by its health-giving springs and baths, and delighted with the cheerful home comforts, good and abundantly supplied tables. Do not fail to visit Anderson Springs when in search of health and recreation. New cottages and improvements have been added to the place during the last few seasons. See announcement in our advertising columns.

For Sale.

State and County Right to a Fly Trap, warranted to keep your house free from flies. Send stamp for particulars to Z. Xovers, 208 Brannan St., San Francisco, Cal.

About Obtaining Patents.

Patents are Virtually Contracts.

The Patent Law provides that in case a patent, which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, in order that it may afford him complete protection for his invention during the life of his patent.

Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented to another. This requires an exhaustive search among all the patents in the class to which the invention relates. If, by this "preliminary examination," the improvement is found to have been previously patented, our client will receive, for the small sum of \$5 for the examination, a verbal or written report showing definitely wherein his invention has been anticipated, thereby saving him further expense and perhaps much time, anxiety, etc.

To avoid all needless delay, however, and secure patents at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with \$15 as a first fee-toll of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately and forwarded to the inventor for his signature. When he receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order or express receipt for our own fee. The case will then be promptly filed by us to the Patent Office, and vigorously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps.] When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of \$20 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretense of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give up a case so long as there is a chance of obtaining a patent. The Agency charge, including drawings, rarely exceeds \$40, and for this we do all we can without appealing the case.

Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in lubricate cases. Perfect drawings of practical working machines are more satisfactory to the Patent Office than the old cumbersome system of storing up an immense bank of countless models.

Drawings or sketches, sufficient to illustrate the invention clearly, with a description that will enable us to make a full set of perfect drawings for the Patent Office, is all that we require. A model will answer our purpose as well, however, in cases where the inventor can more easily furnish it.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings often prejudice capitalists and manufacturers against the invention, while in reality it may be of great value, and would meet with ready sale had it been skillfully, completely and artistically portrayed. In all cases prepared by us the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken to have the invention fully and clearly shown by different views, so that the improvement will be readily understood by the Examiners in the Patent Office, and comprehended by the public who the patent is granted.

Advantage to Inventors on the Pacific Coast.

The firm of DEWEY & Co. has edited and published the MINING AND SCIENTIFIC PRESS continuously since 1860, a period of 26 years. Few agents who are still engaged in the business, have had so long-extended practice in patent soliciting. The members of the firm give personal attention to the applications entrusted to their care; and their familiarity with inventions and with local affairs to the Pacific States and Territories, enables them to understand the wants of inventors on this coast more readily and thoroughly, as we believe, than any other agents in America. Thus there is saved a great deal of the time which ordinarily—when distant agents are employed—is wasted in preliminary writing back and forth.

This happy combination of long business experience together, and wide connections, has placed our firm in a position unquestionably most fortunate for affording inventors prompt and reliable advice, and the best facilities for securing their full patent rights with safety and dispatch at uniformly reasonable rates.

Every patentee of a worthy invention is guaranteed the gratuitous publication of a clearly-stated and correct description of his invention, in one or more of our influential and reliable newspapers, affording just the circulation best calculated to widely inform the class of readers especially interested in the subject of his invention.

Caveats.

A caveat is a confidential communication made to the Patent Office, and is therefore filed within its secret archives. The privilege secured under a caveat is, that it entitles the caveator to receive notice, for a period of one year, of any application for a patent subsequently filed, which is adjudged to be novel and is likely to interfere with the invention described in the caveat, and the caveator is then required to complete his application for a patent within three months from the date of said notice. Caveat papers should be very carefully prepared. Our fee for the service varies from \$10 to \$20. The Government fee is \$10 additional.

To enable us to prepare caveat papers, we require only a sketch and description of the invention.

Rejected Applications.

Inventors who have rejected cases (prepared either by themselves or for them by other agents) and desire to ascertain their prospects of success by further efforts, are invited to avail themselves of our unrivaled facilities for securing favorable results. We have been successful in securing Letters Patent in many previously abandoned cases. Our terms are always reasonable.

Inventors doing business with us will be notified of the state of their application in the Patent Office whenever it is possible for us to furnish such information.

DEWEY & CO.

Patent Solicitors, Office of SCIENTIFIC PRESS, 252 Market St. Elevator entrance, No. 12 Front St., S. F.
O. H. STRONG, W. B. EWER, A. T. DEWEY.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING MAY 5.	WEEK ENDING MAY 12.	WEEK ENDING MAY 19.	WEEK ENDING MAY 26.
Albion.	3.40	3.65	3.50	4.60
Alta.	2.45	2.65	2.80	4.40
Andes.	1.90	1.75	1.85	2.30
Argenta.	.25	.35	.25	.30
Brophy.	3.65	4.00	3.75	5.25
Brother.	7.00	7.25	7.00	11.00
Bullion.	2.35	2.40	2.30	3.15
Baltimore.	.95	1.00	.95	1.25
Belle Isle.	.80	.90	.70	.80
Bodie Con.	2.70	3.00	2.70	3.00
Benton.	.95	1.40	1.30	3.00
Bodie Tunnel.	1.30	1.40	1.30	1.35
Bulwer.	1.30	1.40	1.30	1.35
Con. Va. & Cal.	14	16	14	24
Challenge.	2.40	2.50	2.30	3.00
Champion.	7.25	7.25	6.50	7.25
Chollar.	7.25	7.25	6.50	7.25
Confidence.	8.50	9.00	8.50	10.00
Con. Imperial.	1.75	2.00	1.80	2.25
Caladonia.	.60	.60	.60	.70
Con. Pacific.	.60	.60	.60	.70
Crown Point.	.60	.60	.60	.70
Crocker.	.75	.85	.80	1.00
Central.	.60	.60	.50	.60
Dunley.	.30	.60	.25	.60
Con. Va. & Cal.	.40	.40	.35	.40
Eureka Con.	1.20	1.25	1.20	1.35
Exchequer.	1.50	1.70	1.65	2.00
Grand Prize.	1.20	1.25	1.10	1.15
Gould & Curry.	4.00	4.30	4.15	4.25
Hale & Norcross.	.85	.85	.85	.85
Holmes.	2.50	2.50	2.50	2.50
Independence.	1.00	1.00	1.00	1.00
Iowa.	1.00	1.00	1.00	1.00
Julia.	1.25	1.25	1.25	1.25
Justus.	1.25	1.25	1.25	1.25
Kennecott.	1.25	1.25	1.25	1.25
Lady Wash.	.60	.80	1.00	.85
Martin White.	3.25	3.25	3.25	3.25
Mood.	4.00	4.00	4.00	4.00
Mexican.	4.00	4.00	4.00	4.00
Mt. Diablo.	4.20	4.20	4.20	4.20
Northern Belle.	1.20	1.25	1.20	1.25
Navajo.	1.20	1.25	1.20	1.25
North Belle Isle.	7.75	8.00	7.50	8.50
Nile R.	3.30	3.75	3.50	3.75
Nev. Queo.	3.30	3.75	3.50	3.75
North G. & C.	3.00	3.00	3.00	3.00
Occidental.	3.00	3.00	3.00	3.00
Ophir.	7.75	8.00	7.50	8.50
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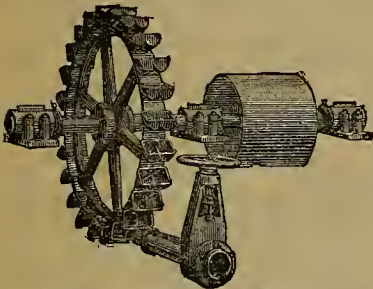
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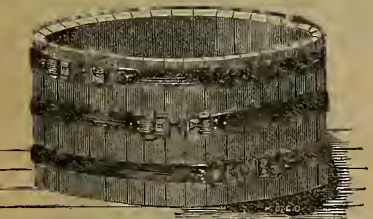
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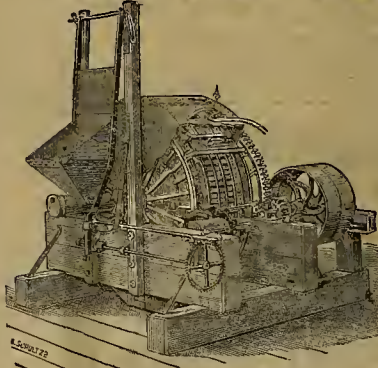
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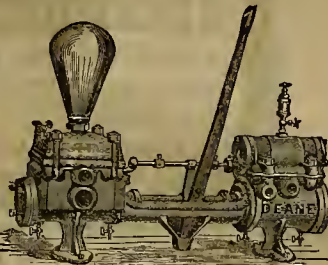
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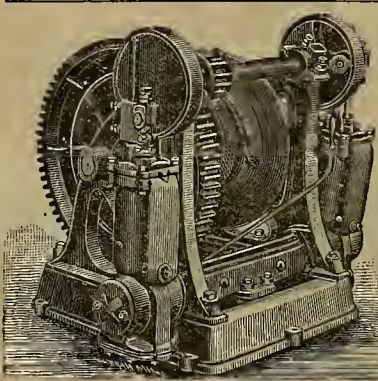
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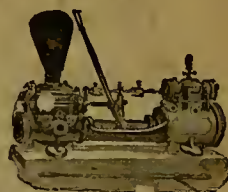


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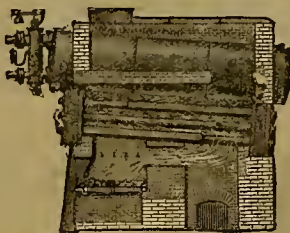
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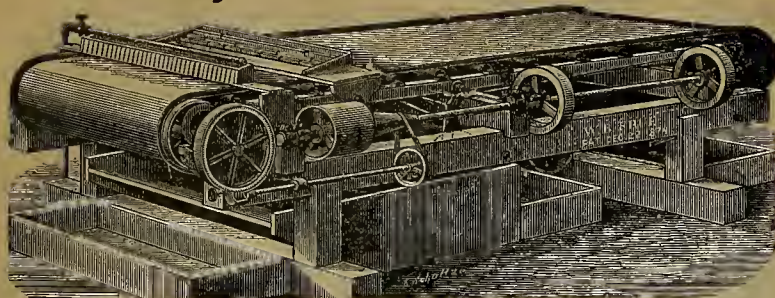
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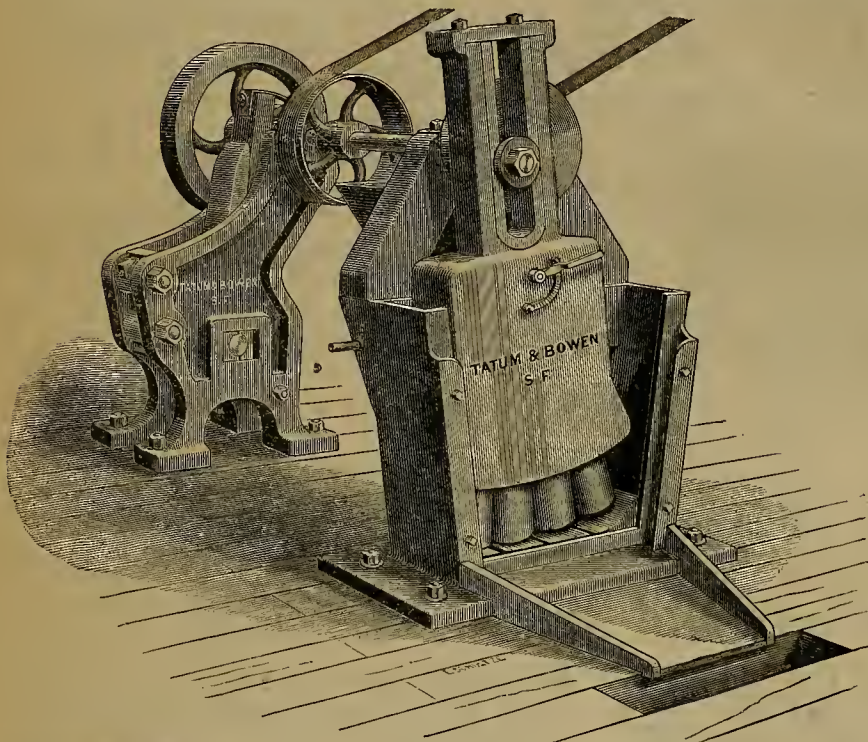
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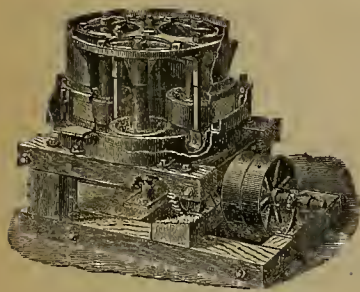
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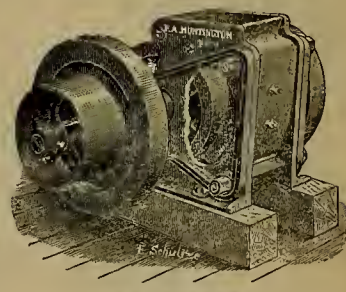
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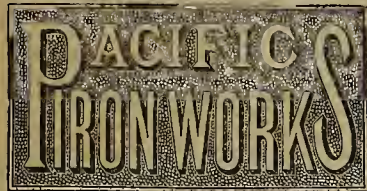
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, JUNE 4, 1887.

VOLUME LIV
Number 23.

Recording Earthquakes.

The Self-Registering Instruments Used.

Few people know the construction or operation of the seismograph, which is an instrument for registering earthquakes. In view of the fact that people on this coast are specially interested in disturbances of the earth, a complete set of these earthquake recorders has been procured for the Lick Observatory, made from designs of Prof. J. A. Ewing, of Dundee. We give engravings of these self-registering seismographs on this page with description extracted from Prof. Ewing's note in *Nature*:

In the design of these seismographs, the object has been kept, in view of making them easily capable of use by observers who have not made seismometry a special study. They are entirely self-recording and require little attention during the long intervals which must, in most situations, be expected to elapse between one period of activity and the next.

One group of instruments is arranged to give a complete record of every particular of the movement by resolving it into three rectangular components—one vertical and two horizontal—and registering these by three distinct pointers on a sheet of smoked glass, which is made to revolve uniformly by clockwork. A single earthquake always consists of many successive displacements of the ground, hence the record traced by each pointer on the moving plate is a line comprising many undulations, generally very irregular in character. The amplitude, period and form of each of these are easily measured, and by compounding the three we obtain full information regarding the direction, extent, velocity and rate of acceleration of the movement at any epoch in the disturbance.

This group of instruments is shown in Fig. 1. In the center is a plate of smoked glass, which gets its motion through a friction-roller from a clock furnished with a centrifugal governor, acting by friction fluid, and balanced so that its speed is not sensibly affected by the shaking of the ground. The clock is started into motion by means of a Palmieri seismoscope, which appears in the figure behind the plate on the right. This is a small common pendulum, whose bob carries at the bottom a piece of stiff platinum wire that projects into a recess in a cup of mercury below—the recess being formed by an iron pin standing lower than the surface of the surrounding mercury. On the slightest shaking of the ground, contact with the edge of mercury takes place, and this closes a circuit which releases an electromagnetic detent and starts the clock. This occurs during the preliminary tremors which are usually found in advance of the main movements of an earthquake. The same circuit starts another clock (of the escapement type), which fulfills two functions: It marks time on the revolving-plate during a part of the first revolution, and then continues to go as an ordinary clock, so that, by inspecting its dial afterward, the interval which has elapsed from the occurrence of the earthquake is known, and the date of the shock in hours and minutes is thus determined with as much precision as the phenomenon admits of. This part of the apparatus is omitted from the figure. The two horizontal components of motion are recorded by a pair of horizontal pendulums set at right angles to each other, but with their indices inclined so that they write side by side on one radius of the plate. The pendulums are sup-

ported on a single stand, but with independent adjustments for position and stability. Each has two pivots, consisting of hard steel points which turn in sapphire centers. At the pivots and at the tracing points every effort has been made to avoid friction. The indices are of aluminium, and a part of their weight is taken by springs (not shown in the figure), so that their pressure on the plate may be no greater than is necessary to produce a trace on the sooty film. The vertical component of motion

recorded, is magnified to an extent which experience of Japanese earthquakes has shown to be desirable in dealing with disturbances ranging from those which are just recognizable as earthquakes up to those which are, to some extent, destructive. For great earthquakes, separate apparatus of the same type is designed, in which the multiplying indices are dispensed with, and the scale and style of the other parts are considerably modified.

Another and distinct instrument is the duplex

FIG. 1.—Complete Three-Component Seismograph, for Motions in all Directions.

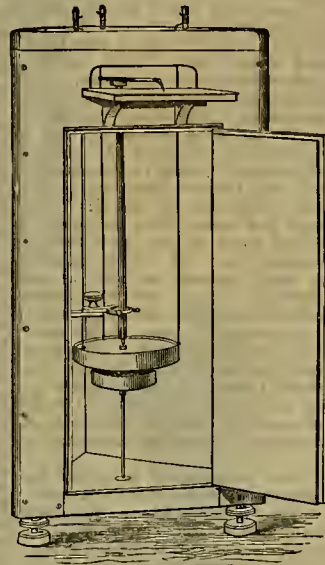
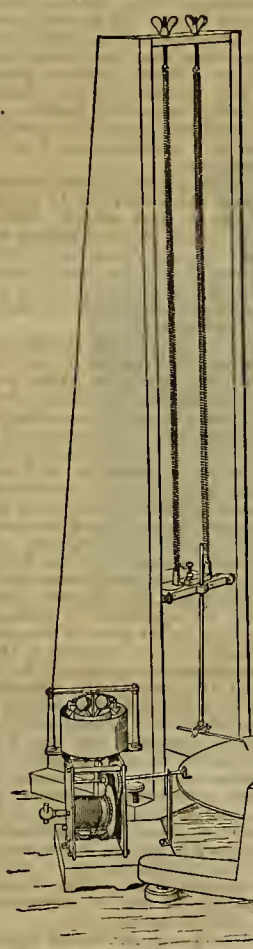


FIG. 2.—Duplex Pendulum Seismograph for Horizontal Motion.

SELF-REGISTERING INSTRUMENTS FOR RECORDING EARTHQUAKES.

is recorded by the instrument which appears behind the clock. A massive bar, free to move vertically about a horizontal axis, is held up by a pair of long spiral springs. Its equilibrium is made nearly neutral by applying the pull of the springs at a suitable distance below the horizontal plane through the axis of support, in the manner described in the article, to which reference has already been made. A bell-crank lever with a jointed index gives a multiplied trace of the apparent vertical oscillations of the bar, which correspond to vertical displacements of the ground. In this instrument, as in the others, sapphire centers are used to minimize friction.

Records inscribed on the plate are preserved by varnishing the plate and using it as a negative to print photographs. The motion, as

pendulum seismograph, shown in Fig. 2. A massive bob is hung by three parallel wires from the top of a three-cornered box, and is reduced to nearly neutral equilibrium by being coupled by a ball-and-tube joint to the bob of an inverted pendulum below it. The two form a system which can be made as nearly astatic as is desirable, and so furnish a suitable steady point for the horizontal part of earthquake movement in any azimuth. The motion is magnified and recorded by a vertical lever geared to the upper bob by a ball-and-tube joint supported on gimbals from a bracket fixed to the box, and furnished with a jointed index which writes on a fixed plate of smoked glass. Records of the kind which the duplex pendulum gives are, of course, incomplete in two important particulars; they show nothing

of the vertical motion (which, however, is usually a comparatively small part of the whole), and they show nothing of the relation of time to displacement throughout the disturbance. But they exhibit very clearly the change of direction which the movements undergo, and the actual direction taken by any pronounced element of the shock.

Water-Wheels.

During the past few years more attention has been turned to the use of water for power in the quartz mines on this coast than was previously the case. As a result, improvements in water-wheels have been made. In the early days, what was known as the "hurdy-gurdy" wheel was largely used in hydraulic mines to provide power for removing boulders and rocks. These wheels were to some extent used also in quartz mines. There are several improved forms of these wheels, and among them the Pelton has proved very efficient. The percentage of power utilized in this wheel is found to be much greater than was formerly considered possible.

In conversation with Mr. Pelton, the inventor, a few days since, we learn that not only are these wheels largely used on this coast, but their fame has gone abroad, and he has sent quite a number to South America, South Africa and New Zealand. They were formerly built exclusively at Nevada City, but are now also being made at the Fulton foundry, in this city.

Four of these Pelton wheels have recently been put into the Consolidated California and Virginia mine, on the Cometock. This mine alone will use 4,000,000 gallons of water per day for power purposes. Water-wheels will also no doubt be put into other of the Cometock mines so far as water can be procured to drive them. Arrangements have been made for increasing the water supply. So much of the power of the water is utilized in this form of wheel that it is in great favor wherever it has been tried.

The California stamp and pan-mill on the Cometock are to be run by the Pelton wheels in the mine shaft, the power being transmitted by wire rope. The pulp from the battery-mill will be conveyed to the big pan-mill by means of a large iron pipe. The pan-mill will also be run by power transmitted to it from the C. and C. shaft. The mill is about 1500 feet from the shaft, and a steel-wire cable for that length will be used. This belt will be supported at proper intervals by means of friction-wheels or pulleys. Moreover, it will not run in a straight line. At one point it will be turned to the northward at quite a sharp angle. The big water-wheels can be put into the shaft and all these changes and improvements made in less than three months. It will not be necessary to interfere with the cages or any of the hoisting compartments of the C. and C. shaft, nor to enlarge it. The power will be brought up from the water-wheels by means of steel-wire cables running in the old-pump compartment. All that will be required will be the cutting out of proper stations for the water-wheels and the other wheels or pulleys that work in connection with them.

The Georgetown Gazette says: It is estimated that about \$50,000 worth of gold dust is sold at this place and Georgia Slide during the year. Of this amount, the Chinese sell about one-half.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Coal Mines and Geology.

EDITORS PRESS:—In your issue of May 14th there appears the following paragraph:

"An Annot, Pa., miner took out a piece of sulphur a few days ago, which was a perfectly formed ear of corn, the kernels and rows being very distinct. It was under 20 feet of solid rock, and in the middle of the coal vein."

With the casual reader the fact stated in the foregoing paragraph has little significance; but those who give that subject careful attention will perceive that it has a very important relation to the science of geology. Professors of that science teach that during the carboniferous or coal-producing period of the earth's history, the climate, the vegetable and animal life were extremely different from what is at this time existing; that the atmosphere was then so largely composed of carbonic acid as to produce a vegetation much exceeding in redundancy anything now existing, but at the same time precluding the possible existence of any of the higher forms of animal life. That the entire surface was continuously blanketed (so to speak) with a vaporous covering causing a climate of extraordinary warmth and moisture, in which tree-ferns were the principal growth, there being no flowering plants of any kind other than some few cone-bearing trees remotely allied to the pines of the present time. That such a climate was uniform, and caused the same kind of productions. "From the Bolivian Andes to at least the 76th of latitude, probably to the poles." Now, in contradiction of what has been assumed in this regard by geologists, the finding of this imprint of an ear of corn proves that at the time this Pennsylvania coal was formed there certainly was at some places a climate the same as that now existing.

I have personal knowledge of another fact, which proves that the same is true of coal deposits on this side of the continent. In sinking the shaft for the opening of the mine at Nanaimo in British Columbia, where the disastrous explosion so recently occurred, there was found the imprint of a perfect palm-leaf, three feet in length. This was sent away to Eastern Canada before I knew of its having been found; but I afterward procured a beautiful specimen of the same kind, embracing about half the length of a leaf. Associated with it were a variety of other small leaves of deciduous trees.

Geologists also teach that coal is the result of vegetable growth directly in place where the beds now lie. That where there are a series of veins on above the other, each vein represents an oscillation of the land level; that is to say, the land must remain above the water long enough to produce a growth sufficient to form the vein of coal, then has sunk beneath the water to get its proper covering of earth. Then it must rise again to receive another growth of coal material. Geologists have assumed that in the formation of coal each foot in thickness of the vein, and also of the inclosing rock, represents a period of about 1000 years. The coal which is being mined at Nanaimo has in some places a thickness of eight feet. The shaft which reaches the coal where this recent accident occurred has a perpendicular depth of 600 feet; consequently the two taken together on that basis will represent a period of more than 600,000 years.

In a stone quarry on the surface, not far from this shaft, I have seen as many as four distinct seams of coal as perfect as that which is being mined, all embraced in one foot thickness of sandstone. From a geological point of view this circumstance would indicate that somebody or something has been driven to imprudent haste in the evolutionary development of coal. Darwinism and geology have now become inseparable. Viewed in that relation the most reasonable conclusion is, that at some previous time natural selection and survival of the fittest had agreed upon a division of labor. That in eliminating man the former had got ahead with his work—probably had him divested of his caudal appendage—perhaps already advanced to the gorilla stage of existence. The latter being admonished that such men as Darwin, Thompson, Spencer and Huxley would soon be on the stage, attempted by inconsiderate haste to compensate for his former laggardness.

While treating of this subject I would direct attention to another inconsistency in the teaching of geologists and Darwinian evolutionists. They aver that during the carboniferous era and for a long series of ages after that, although the world was filled with monstrous flesh-consuming reptiles there were not any herbivorous animals. Now in so far as we may reason by analogy, those were impossible conditions. If all the herbivorous and graminivorous animals were at this time exterminated, all those that are carnivorous would quickly perish from starvation, for I think no one will contend that any animal organism can subsist on a food exclusively mineral in character.

I will mention another fact of my own observation in disproof of one of the assumed principles of geology. Near to the town of Nanaimo, heretofore mentioned, there is a large granite drift boulder identical in character with thou-

sands of others scattered over the land in British Columbia, Washington and Oregon. It has been divided for the purpose of making a roadway along a hillside on which it lies. The division reveals streaks of small pebbles in it not differing in any respect from similar occurrences which frequently occur in common sandstone. This fact is of itself sufficient to prove that granite is an aqueous formation. Geologists may say that I am mistaken in my observation. The rock is still there to be seen by any one who may choose to take so much pains; but I apprehend that no geologist will ever see it. If one were dragged to the spot he would shut his eyes, or cover them with his hands like a woman or child wishing to hide from their sight some hideous object. JUSTIN CHENOWETH.

Mining Parlance.

EDITORS PRESS:—Your article headed "Mining Parlance," in issue of April 23d, not only contains a world of truth, but also allows a much wider application than is there given it, and furnishes food for serious thought as regards the light in which mineralogical and metallurgical questions are viewed by the average director and "business" manager.

It certainly seems, in many cases, a matter of perfect unconcern to them whether or not the machinery be imperfect, the methods faulty or the resultant wastage excessive, as long as they cannot literally see the metals running away in the slags and dumps, and just so long as dividends can be paid by hook or crook. All is serene, regardless of the principles of mining and metallurgy.

Your article speaks of a "prominent mining man" who asked, "What kind of iron ore is manganese?" and adds that "persons charitably disposed might say that 'this is only one instance out of a hundred.'" If so, then I can bring forward several other "cases out of a hundred," but will offer only one or two.

For instance, is the above remark, as coming from a "prominent mining man," merely, as pitiable as is the following, emanating from a man placed as metallurgist—save the mark—over several furnaces? Going to the chemist, one day, when the furnaces were not in the heat of order imaginable, he asked: "Mr. Blank, what is this blamed silica, anyhow? I hear a good deal about it, but don't think I ever came across any."!!! In the name of metallurgy, what business had such a man around a furnace? He it was who, beside performing numberless other unheard of feats, turned a 1½-inch stream of water into the stack to "keep her from blowing out." In spite of the confidence reposed in him, he was soon found a financial failure. A successor was appointed from among the vast army of book-keepers you mention, with no knowledge of either mineralogy, elementary chemistry or metallurgy.

He came into possession of a formula for charge calculation that seems to me a curiosity, belonging to the day when tobacco juice was used in amalgamation, and which serves for every kind and class of ores that come to him. Moreover, these ores embrace about all the most formidable enemies of the smelter. Substantially the rule runs as follows: "A pound of silica calls for a pound of iron, and lime must be added equal to two-fifths the iron used." The only determinations made by the chemist upon which to base this complicated calculation are those of silica, lead and silver in the ore, the silica and iron in the iron ores being guessed at, for the most part, and all other components being totally ignored. By using from 10 to 11 ounces blast and fuel enough, the conglomeration is melted and bullion produced, but the condition of slags and furnaces might easily be predicted.

Again, of a superintendent of extensive mines, the question was asked: "Are not your ores highly siliceous?" and he answered: "Yes, sir, and they are mighty sandy, too."

Now blunders like these would be vastly entertaining and amusing could one forget that they come from men in authority. Otherwise amusement turns to ridicule and ridicule to pity. Nor is this ignorance of mining parlance and principles the most deplorable feature in connection with such cases, for I have invariably noticed that these men are very narrow-minded, prejudiced and unreasonably contemptuous toward anything whatsoever pertaining to science and progress, as well as toward those more skilled than they. All this is sincerely to be regretted in a profession calling for the most intelligent direction and accurate information, and I have added these observations to yours simply as another protest against the blindness that insists on placing men unfitted for the profession in positions of authority, and also against that dogged persistence of the home office in thinking that "Tom, Dick and Harry, bookkeeper, dry goods clerk and Jack-of-all-trades" are singly and collectively perfectly capable of managing mine and furnace. In other words, that they can learn in a month that which constitutes a life's work and life study. You say truly that the man himself "not only sets himself at ridicule, but also the company which he represents." PROTESTER.

THE Supreme Court of the United States has announced a decision which renders all users of driven wells, not authorized under the Green patent, liable to damages for infringement.

Leaching Silver Ores.

[Written for the MINING AND SCIENTIFIC PRESS by C. H. AARON.]

This subject is attracting more attention than formerly; the introduction of the Russell process has at least provoked inquiry.

As some of your readers may not know what the Russell process is, I will say that it consists essentially in leaching the roasted ore, first by the Patera process, and then a second time with the addition to the leaching liquid of a certain proportion of bluestone. The solution thus "doctored" is called "extra solution," and is said to dissolve silver sulphide and some other compounds which ordinary hypo will not; also that it dissolves metallic silver more rapidly than simple hypo. (This latter statement requires verification, since it is known that copper precipitates silver from a hypo solution.) The use of the Russell process requires a separate storage vat for the extra solution. If the silver in the ore is chloridized to a high percentage, the extra solution is not worth its cost and trouble. In some cases, ores can be leached successfully by the Russell process without roasting; there are also cases in which neither roasting nor extra solution is requisite. As the Russell process is patented, its merits have naturally not been much investigated except by the parties interested, whose statements may possibly be a little too highly colored. Mr. Russell seems to prefer to apply his modification to the Patera rather than to the Kiss process, that is, to use the sodium hypo and the sodium polysulphide rather than the corresponding calcium salts, which are generally supposed to be the cheaper, and to possess other advantages, which, however, exist rather in fancy than in fact. For instance, it is alleged that the Kiss process gives a better precipitation of the silver than the Patera; also, that the former can extract a portion of gold if present, and that the latter can not. Against the first proposition we have the positive assurance of Mr. Russell, and against the second we have the authority of chemistry, and I, at least, of direct experiment.

As far as the Russell process is concerned, I see no reason why it may not be used in conjunction with the Kiss process. There would be a little calcium sulphate formed, but that would not be likely to do any harm. Moreover, this objection, if it be one, could be overcome by using copper chlorides instead of sulphate. Mr. Russell's preference must be chiefly based on other considerations.

A branch of the Russell process yields my lead that may be extracted in the leaching, separately from the silver. This is accomplished by the addition of sodium carbonate to the leach, which throws down the lead, leaving the silver dissolved.* The method, of course, necessitates the use of the Patera process; but the same object can be attained in the Kiss process by means of lime. However, the cases in which the saving of lead would be an object are comparatively rare, especially as it involves the use of a double set of precipitating vats. In those cases in which, as formerly at the Silver King works in Arizona, the precipitated silver is refined by cupellation, the separation of lead in the vats would be superfluous. I think, on the whole, we may set the question of separation of lead aside, and consider the merits of the Patera and Kiss processes on the basis of the relative prices and efficiency of the substances consumed in each, including the sulphur because the Patera admits of a considerable saving in that item, as compared with the Kiss. We need not consider the original cost of the two hypos for two reasons; firstly, because they are reproduced constantly by either process; secondly, because the calcium hypo is not in the market, and we always begin with sodium hypo which, in the Kiss process, is soon replaced by calcium hypo through the use of the calcium sulphide for precipitating. The whole question then hinges on the kind of precipitant used, sodium or calcium polysulphide.

The solvent powers of the two hypos for silver compounds are so nearly equal that there is, practically, no choice on this ground. It is claimed by Mr. Stetefeldt, on the strength of Mr. Russell's experiments, that the calcium hypo suffers more rapid deterioration than the other by exposure to the air; but the argument is of no practical value, because the fact, if it be a fact, produces no inconvenience in the works, where, with proper care, there is never any lack of leaching solution, granting a sufficient stock in the first place.

There are two reasons why less sulphur is or may be consumed in the Patera than in the Kiss process: The first is, that in the former the precipitant may be a disulphide (even a monosulphide might be used, but is objectionable because its oxidation by atmospheric influence forms a portion of caustic soda), while in the use of the calcium salt we are restricted mainly to the pentasulphide on account of the slight solubility of the other calcium sulphides. But a pentasulphide precipitates no more silver, molecule for molecule, than a disulphide, though containing 2½ times as much sulphur.

*This reaction was discovered by the writer, in conjunction with Mr. G. F. Beardsley, in 1882.

Add to this that there is more unavoidable waste of sulphur in preparing the calcium salt than with the sodium compound, because the best lime is even more impure than commercial soda, and the impurities are insoluble and retain a considerable proportion of sulphur. Another point in favor of the Patera process is, that the precipitant is made with very little expenditure of time, labor and fuel, while that for the Kiss process requires the cleaning and slaking of the lime, three or four hours' boiling, then settling, filtering and washing, and final removal of insoluble residues.

If all the materials are pure (and the sulphur may generally be assumed to be so), and if the precipitants are made in the usual way—that is, by boiling the caustic soda or lime with sulphur in water—one pound (avoirdupois) of silver requires for its precipitation, by the Patera process, 0.55 + pounds of caustic soda and 0.44 pounds of sulphur; by the Kiss process 0.39 pounds of lime and 0.9 pounds of sulphur nearly. These facts afford a basis of calculation as to the relative economy of the two processes after the percentage of purity of the soda and lime obtainable has been ascertained. Another point which may in some cases be worth considering is the possibility of recovering a portion of the excess of sulphur in the precipitated mass by boiling that with clean slaked lime (milk of lime), or with caustic soda. In the Kiss process this recovery may amount to a little more than half of the total sulphur used; in the Patera it will not be much more than one quarter of the total, if the precipitant consists mainly of the disulphide as recommended.

As to the actual cost for either process, great allowances must be made for the presence of base metal in the leach and for oxidation of the precipitant by atmospheric action, which is constantly converting it into hypo. The latter circumstance does not involve an unmitigated loss, for the hypo thus formed is one of the means by which the strength and volume of the leaching solution is kept up, notwithstanding a certain loss in working and the deterioration by exposure.

At the Silver King works in Arizona, I used, for 1 pound of silver extracted, 2.2 pounds of lime and 1.16 pounds of sulphur. In this case the lime was very impure, and a good deal of base metal had to be precipitated with the silver. I have no record at hand of my consumption at Melross, where I had excellent lime.

C. A. Stetefeldt, M. E., says in the *M. & E. Journal*, that at the Cosihuiriachic mill, in Mexico, Russell made comparative trials with the two precipitants with the following results: For each pound of silver got there were consumed, in the Patera process, 1.8 pounds soda and 1.2 pounds sulphur; in the Kiss process, 9.0 pounds lime and 3.84 pounds sulphur. I have no hesitation in saying that the figures given for the Kiss process are erroneous, or the process was not properly worked.

O. Hofmann, M. E., on ore from the same mine, by Kiss process, used, for each pound of silver extracted, 2.66 pounds of lime and 1.25 pounds of sulphur, which is reasonable.

CONFIDENCE IN THE COMSTOCK.—A dispatch from Virginia City says: There are more improvements now in progress on the Comstock than at any time since 1876. The current year promises to be the most prosperous in its history since 1878. There is a large force employed in preparing the foundation and framing timbers for the new stamp-mill at the Chollar shaft. The California battery mill is being overhauled and will soon wake the echoes of Six-mile canyon with the thunder of its 80 stamps. The water company has a force employed in laying a 12-inch iron pipe across Washoe valley and a wooden flume on the east side, which is completed to Bullion ravine. Several new private residences will be erected during the summer. Real estate has also advanced rapidly in value. This is illustrated by a transfer recorded last week, when \$250 was paid for a vacant lot on the divide where two years ago an area large enough for a cattle range could have been purchased for that sum. The increase of crushing facilities will result in materially augmenting the force of miners now employed in extracting ore, and lead to the development of many mining localities now virtually abandoned. The prospects of an era of increased prosperity are flattering enough to warrant the prediction that the total sum of monthly pay rolls will be swelled to \$300,000 before the close of this year, while the bullion product of the lode promises to exceed \$8,000,000 in 1888.

PLATINUM.—There is a large demand for platinum in New York at this time, and the mineral is worth as much in the market as gold—say \$16 to \$17 an ounce. One man at Coos Bay secured about 15 pounds, and this has been sent to Professor Day, the United States Geological Assayer. There is any quantity of platinum in Coos and Curry counties, but like the gold dust so often mentioned, is mixed with sand on river-banks and the ocean beach, and costs as much as it is worth to separate it. Platinum is also found in some places on the banks of the McKenzie, mixed with sand. Several nuggets of mineral have been found in the Granite Creek district in British Columbia, a few miles north of Colville, and specimens were sent to Prof. Day and pronounced first-class. Should the platinum be found in considerable quantities in this district, the finder, of a verity, will have struck a gold mine.—Portland Oregonian.

Southern California.

[NO. 2.—CONTINUED.]

(Editorial Correspondence.)

California is an empire of itself, both in extent and importance. It is over 700 miles in length, and has an average breadth of over 200 miles. It is four times as large as the great State of New York, twice as large as Italy, and nearly as large as France.

The Santa Ana Valley.

To the south of the city of Los Angeles, which formed the subject of our last letter, there is the large, level and fruitful Santa Ana valley, which takes its name from the Santa Ana river. Near the center of this valley is located one of the earliest colonies in Southern California—Anaheim. The story of the settlement and growth of this colony is well known to most of our readers. It is now, and for many years has been, an incorporated town, and has become quite a business center. The business portion of the town is well built up with substantial buildings. The streets are wide and very generally bordered with willow, pepper or sycamore trees, and present an appearance which is rarely excelled for picturesque and rural beauty. The waters of the Santa Ana river are largely utilized for irrigation, while in most portions of the valley artesian water can be obtained at very little expense. The climate of the entire valley is very equable, though generally moist from its close proximity to the ocean. The monthly average of the thermometer rarely ranges outside of from 50° to 72°. This, like all the other localities in Los Angeles county, is experiencing the general boom. The construction of the Atchison & Topeka railroad is giving an increased impetus to business generally. Real estate is rapidly advancing in value, and new settlers are constantly coming in. What has been done and is now being done in the San Gabriel and San Bernardino valleys will soon be repeated in the Santa Ana valley. There will be a succession of towns and villages all through the county. Already Tustin City, Orange and Santa Ana have so grown together that they practically comprise one community. They are now building a system of street railroads to more readily move from one section to the other of these lovely towns and villages.

Through the San Gabriel Valley.

The San Gabriel valley, however, is the great attraction to visitors, and, in connection with that of San Bernardino, forms the crowning beauty of the county and the State as well. This charming valley, all the way from Los Angeles to the foot of old Mt. San Bernardino, a distance of over 70 miles, is dotted with beautiful towns and villages, while one almost continuous line of orange groves and vineyards extend throughout the entire distance. The valley is traversed by two railroads and the route for a third is now being surveyed. The construction of the new railroad from Los Angeles to San Bernardino is opening up

A Great Number of New Towns

As the cars of the San Gabriel road leave Los Angeles, they pass through a section of country dotted with villas and orange groves, which is rapidly filling up with beautiful homes. The first important place reached is

Queenly Pasadena.

Which already has a world-wide reputation. Situated on the higher ground of the San Gabriel valley, 900 feet above the level of the sea, girted by towering hills and lofty mountains, she is warmed by a golden wealth of sunshine, and fanned by perpetual summer breezes. With a natural scenery not surpassed by Alpine lands, she is embowered in groves of orange and other tropical trees, and perfumed by flowers of every hue and shade, to which is added innumerable palace, homes and beautiful cottages, which are crowned with that gem of human art, the "Royal Raymond." No place is more justly famous on mesa, plateau or valley. It constitutes a beautiful park, and every traveler who visits it cannot fail to carry away most pleasant recollections, as of a visit to some fairy land.

Leaving Pasadena.

The next town reached, some four miles distant, is pretty little Lamanda Park. One mile further and the cars reach a spot where a new depot is to be erected, which will be the stopping-place for travelers going to the Sierra Madre villa and the new town of Huntington. The train stops next at Santa Anita, 17 miles east of Pasadena, from which point the traveler speeds on over a beautiful panorama of towns, villas, orchards and vineyards, through Baldwin's famous grants, to Monrovia and Duarte, until he reaches Azusa, 24 miles from Los Angeles. From hence a succession of towns, new and old, are reached in the following order: Gladstone, 26 miles from Los Angeles; San Demas, 28; Claremont, "the beautiful," 30; Pomona, 33; Ontario, "the foothill paradise," 38; Lordsburg, 40; Cocomungo, 42; San Bernardino, 60.

The Village of Pomona

Is located on the line of both the Southern Pacific and the Atchison & Topeka or California Southern railroads. The town is poetically and most appropriately named. It is romantically situated, in a charming spot, with beau-

tiful surroundings, while industry and intelligences are constantly adding new charms to the locality.

San Bernardino.

The San Gabriel valley at its eastern extremity gradually merges into what is known as the San Bernardino valley—a circular area of some 15 to 20 miles diameter. Near the center of this valley is located the city of San Bernardino, upon one of the most delightful localities a person can well imagine. The fertility of the soil, an abundant supply of the purest water—both river and artesian—a most genial climate, in connection with the delightful scenery which meets the eye in every direction, serves to render this a most desirable place for residence. In addition to the above natural advantages, art and enterprise have united in giving to the city

Commercial and Industrial Advantages

Of a most important character. Located in the midst of a most fertile valley, made up of a great variety of soil characteristics, it presents to the agriculturists who would locate therein and become tributary supporters to the city opportunities for producing the widest range of products. The mesa lands along the foothills, which almost entirely surround the valley, furnish the most desirable soil and climate for the culture of citrus fruits which can be found in the State—perhaps we might say in the world. The grape flourishes here to perfection, either for wine or raisins. All the mesa lands have to

Gridley and His Sack of Flour.

In the spring of 1864 fairs were held all over the land to recruit the funds of the Sanitary Commission, which had already raised over \$3,000,000 in following up the advance in readiness for battle; in hearing, from the heaps of dead and dying, the wounded to quarters of comfort; and on the retreat, ministering to agonized men who begged for water or to send a few words home.

Meanwhile, the need for money to keep up the work was pressing, and none felt the piteous appeal of soldiers helpless, hapless, on the field more than this sympathetic war-Democrat Ruel Colt Gridley, who bethought him to auction his sack of flour for the Commission—each one buying it to put it up again for sale. He had borne it, trimmed with streamers and flags, through the main street of Austin, from Upper Austin to Clifton, a mile and a quarter, to the air of "John Brown," to pay a wager that the "Democratic nominee for mayor would be elected."

After expressions of mutual good-will across the query, what to do with this flour? The proposition to make Republican griddle-cakes, allowing Democrats none, drew protests of fealty to the Union from Democrats. Mr. Gridley tested this crowd's vaunted loyalty by the plan of auctioning the flour for the soldiers.

Wild cheers greeted this proposal. T. B.



THE GRIDLEY MONUMENT.

be irrigated, for which an abundance of water can be obtained from the numerous streams which flow from the adjacent mountains. These streams can also be supplemented and their volume of water kept up during the dry months of summer by

A System of Mountain Storage

For which large and convenient mountain valleys are found, which may readily be converted into huge reservoirs of winter water, which, without such storage, would pass off into the ocean during the winter and early spring months, without benefit to industry or commerce. One such system has already been perfected by the Bear Valley Water Co. Others are possible and will be provided as soon as a sufficient number of settlers come in to locate and create a demand for such surplus water. In this manner every acre of mesa land of this and the neighboring valleys will soon be utilized and covered with trees, vines and happy homes.

ALASKA MINES.—The steamer Olympia, from Alaskan ports, brings news that 20 miners left last week for the Upper Yukon country from Juneau, and every man entering that country is compelled to pay a royalty to a tribe of Indians who command the road, for the privilege of passing through the country. About 200 men have departed this season from Juneau for there, and only meager reports have been received, which indicate that they are striking rich finds. Some rich quartz ledges have been discovered in the town of Juneau, where some fine mineral specimens have been obtained. Large shipments of gold bars from the Pais mine were made on the steamer Pinta, valued at \$20,000 for each of the eight bars. Reports from the Silver Bow district continue to indicate that a large amount of mineral is being obtained from the mines.

Wade, auctioneer, cried off the first bid to Mr. Gridley for \$300, a Republican \$350; Mr. Buel, beaten candidate for mayor, bid a certificate of the Indian Department, \$1115, but all bids were payable in gold coin, and the munificent offer was rejected. Five thousand dollars was paid over and two blocks of lots in Watertown—one given by Mr. Buel.

With Mr. Gridley on a fine horse, the procession formed again and escorted the hero in triumph home. He paid the express charges and sent the money to the commission.

Gold Hill wanted a chance, so on May 16th a procession, with Mr. Gridley, formed through the main street to Maynard block, where "silver-tongued" Tom Fitch spoke, and the flour realized \$5225. The procession was christened "The Army of the Lord," as it marched through the canyon with flags and music to Silver City, where in all \$1375 was raised; thence to Dayton, where \$1847.50 footed up for the fund on Carson river.

Through all the Washoe mines it was sold, till \$22,000 more was placed to the credit of the Midas sack of "Austin Sanitary Flour." Virginia City outdid all others, contributing \$12,995 in coin and considerable mining stock. To Sacramento and San Francisco he took the magic sack, selling and reselling it, till when he started East \$63,000 stood to its account, with three blocks of lots in Austin, worth \$7000, and a house and lot in Dayton.

Through all his journeying, he bore his own expenses and the expressage of money, and raised in coin \$275,000, in all nearly \$300,000.

The monument soon to be finished and dedicated in Rural cemetery, Stockton, in honor of the hero of the famed "sanitary sack," is thus described in the *Independent* of 19th inst., according to the plans and specifications:

The monument is to be made of California granite and Italian marble, and will be 20 feet high. The bottom base is to be of Penryn

granite, 6 ft. square by 2 ft. 4 in. high, neatly finished with a patent hammer, 8 cuts to the inch. The second base is to be of Crystal Lake or Rocklin granite, 4 ft. 11 in. square, by 1 ft. 8 in. high, neatly finished with a patent hammer, 10 cuts to the inch. The third base, of Italian marble, 4 ft. 1 in. square, by 1 ft. 6 in. high. The same to be polished with the name of "Gridley" inscribed thereon in letters raised 1 inch. The die to be made of Italian light vein marble, 3 ft. 3 in. square by 5 ft. high. The columns and die to be cut in 1 piece and polished. The inscription is to be in finely cut raised letters. The plinth of Crystal Lake or Rocklin granite, 3 ft. square by 10 in. thick, polished. The cap of Rocklin granite, 3 ft. 11 in. square, by 1 ft. 10 in. high. The face of the cap polished on four sides.

The figure to be made of the best light vein Italian marble, 2 ft. 6 in. by 2 ft. 7 in. by 6 ft. 10 in. high. The same to be cut from a photograph of Mr. Gridley so as to closely resemble him.

The concrete foundation is to be 6 ft. 8 in. square, and not less than 6 ft. 6 in. deep. The monument will be reared in the Grand Army park, which has been graded for the purpose. The contractors, Knealeys, Spellman & Co., have completed the foundation in a manner entirely satisfactory to the committee, and are only waiting for the arrival of the statue from Italy to finish their work.

The Secretary of the Treasury has just written the committee that there are ample provisions in the statutes to authorize the free entry of the statue. An effort is also being made to secure from Alcatraz 14 pieces of ordnance, to be used in further ornamentation of the plat in which the monument is to be erected; and as Gen. Howard and ex-Congressman Lottitt have interested themselves in the matter, there is some hope of obtaining the coveted cannon.

RELICS OF '49.—Scattered here and there among the pines and thickets, along the streams that were mined away back in the fifties, are many lonely graves. The lapse of years has destroyed the stakes which once stood at head and foot, covered them with leaves, and in some cases trees are growing upon the little mounds, and in a few more years there will be nothing left to mark the resting-place of many a pioneer who died and was hurried without the rites of burial. Many of these graves are lost to even those who once knew where they were, and in a few years there will remain to us nothing of them but memories. Along the banks of Deer creek, the Yuba and all the other streams that were once remarkable for their richness, can be seen the sites of the cabins of the '49ers. Time has destroyed the walls and roofs of those cabins, but the level ground floors and the old stone chimneys, plastered with mud, still remain. These old chimneys are the only monuments left to mark the places where the pioneers lived through the stirring "days of gold." And even the chimneys are fast crumbling with decay. Vines, weeds, bushes, and the mold which gathers about all old ruins, have been slowly hiding them from sight.—*Nevada City Herald*.

THE KEENNESS OF DISCERNMENT IN THE PHOTOGRAPHER'S LENS.—The photographer's lens is more discerning than the naked eye. A recent photograph of a figure painting by an American artist shows that a woman's gown was first painted a hue and texture very different from that finally chosen, the underlying brushwork appearing plainly in the photograph, though not seen by the most attentive observer of the original picture. In like manner, photography reveals stars that to the human eye are not distinguishable from nebulous matter. Photography has also been recently introduced as an assistant in diagnosing disease, as was shown in a paragraph in our Health Department of a few weeks since.

AN OLD ENGINE.—A little engine with a history going back to the '60's may be seen at the West Oakland yard. It was built to operate the old Alameda & San Francisco railroad, which ran from Alameda Point to Melrose, and was one of the first railroads in the State. This locomotive was built in 1865 at the shops of the road in Alameda, and has a 14 inch stroke. Not much of the original material remains because it has been rebuilt and repaired many times, but it still retains its name, "J. G. Kellogg." Recently it was in use on the Stockton & Copperopolis road, but was brought down to pull the Berkeley local.

THE marine engineers are discussing the standard of wages for engineers and firemen on the new steam schooners now being built for the coasting trade. The engineers say that the owners of the new schooners intended to run their vessels on a reduced crew and for about half the wages usually paid. Resolutions were adopted fixing the wages of chief engineers at \$120 a month and of the first assistant at \$90, and requiring two firemen to be on each boat. This schedule will be submitted to the schooner proprietors.

TRAVELERS still claim that a volcano is in active eruption in the Sierra Madre mountains in Mexico.

A RAILROAD from Hailey, Idaho, to the Gold Belt mines will shortly be built.

THE Southern Pacific Co. is erecting new boiler shops at Sacramento.



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SAN FRANCISCO:

Saturday Morning, June 4, 1887.

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Passing Events.

There is quite an excitement just at present in Alaskan quartz mines. The new mine on Ounga island, of which we spoke last week, had its working capital subscribed for immediately, and the stock went up very high. Stock in an extension of the mine was also quickly taken up. Another claim was also stocked and the working capital subscribed in two hours. The ledges up there are very large.

The new Monterey county mines still attract considerable attention from residents of that and San Luis Obispo counties. Thus far, however, no very wonderful developments have been made.

The workings of the Alien Land law, to which we have before referred, are being discussed with much spirit by the press of the Territories. There is a universal feeling that, while the measure may do very well to prevent foreigners acquiring large tracts of grazing or agricultural lands, it is a mistake to apply it to mining fields.

Work is now in full blast in all the mining camps in the more elevated regions of the coast, where the long winters retard work more or less.

The lumber sawed in the small mills of the Sierras is mostly taken up in the local trade near the mills and never reaches the larger markets.

Figuring on the Bullion Product.

We gave in last week's PRESS a summary of the Mint Director's report for 1886, including estimated product of bullion in the States and Territories of the Union for that year. As it comes to us, this report is made to say the product of gold last year, as compared with that of 1885, shows an increment of \$32,000,000—obviously an error of transmission or of the types. Two million dollars might have been the figures given, though the actual increase was over three millions.

To Colorado the Mint Director accords the honor of having been the largest gold and silver producer of the several countries mentioned in his report, Montana being ranked as second in this respect. We do not know on just what basis Director Kimball figures in arriving at this conclusion; but, consulting certain data, we are led to doubt its entire correctness, claiming for California the distinction he has seen fit to award to these countries. The bullion product of Colorado and Montana for 1886 amounted to \$25,000,000 and \$20,840,000 respectively, values of copper and lead included. Deducting value of these two last-named metals, say nine millions for Colorado and seven for Montana, would make the gold and silver product of the former \$16,000,000, and of the latter \$13,840,000, against \$17,000,000, the California output of these metals for the year mentioned. Even if we have somewhat overrated the value of the copper and lead turned out in Montana, she is no doubt distanced in the race with California for supremacy as a producer of the precious metals. That California leads every other country in the world as a gold-producer remains, of course, unquestioned.

The extent to which the large reduction works in some of these interior countries, notably those of Utah and Colorado, receive from outside localities ores and base bullion for treatment becomes more or less a source of error in computing the annual bullion product of those countries. The rich silver-lead ores of Idaho, shipped to the extensive smelters near Salt Lake City, and to the great reduction establishments at Denver for sale or treatment, are liable to receive a double credit, unless more care is taken to avoid such result than we have reason to believe is always observed. In like manner, bullion deposited at the U. S. assay office at Helena, but coming from sources outside Montana, is exposed to be credited to the latter.

The list of our bullion-producing countries has come to be officially increased by the addition of another State, Texas finding, for the first time, a place as such in this last report of the Mint Director. Her quota for the year—all silver—is set down at \$200,000.

Gold on Alaska Islands.

Samples of ore from a new mining discovery in Alaska are on exhibition at the office of Geo. W. Sessions, in Nevada block. The new mines are on Ounga island, one of the Chomagin group, 100 miles west of Sitka, 200 miles east of Ounaska, and 1200 miles north of San Francisco. The island is near the southwestern shore of the Alaskan peninsula. It is about 14 miles long and 6 wide. Geo. C. King, who went there for the Sitka Mining and Commercial Company last summer to look for coal and copper, found the ledge in September. In December another expedition of the same company went up and made more careful investigation. The result was that early in April another expedition, with a number of miners, a five-stamp mill and supplies, landed on the island.

Active work was begun on the ledge. It has been traced for some 10,000 feet. It was found that the porphyry hanging-wall on the east was 200 feet from the outcrop, the granite foot-wall on the west was 800 feet from the outcrop, and the outcrop was at no point less than 100 feet in width.

To determine the value of the rock in the ledge, two crosscuts were started—one from the east side and one from the west—at a vertical depth of 50 feet. The crosscut from the west, at a distance of 20 feet, struck a body of galena ore which was from two to four feet thick in the bottom of the cut the day before Mr. Sessions left for home. The assays were from \$5 to \$200 in gold and silver, and the ore

also carried from 70 to 80 per cent galena, which alone, at present quotations, is worth \$80 per ton.

It will be remembered that the big mine of Alaska, known as the Treadwell, is on an island—Douglas—and there are plenty more islands to prospect. This new discovery will doubtless cause a more vigorous prospecting on the islands, as well as mainland of Alaska. A mining district has been formed on Ounga island, where the big ledge has been discovered.

The Alien Act.

As an extra session of Congress seems to be in order, it would in that event be well for our Pacific Coast delegation to do all in their power to so amend this questionable Act that was "railroaded" through at the close of the last session that the mineral lands and mines of our Territories shall be excluded from the effects of this impolitic measure.

"America for Americans" is all very well, and American capital for American mines is something desirable; but, unfortunately for us, our capitalists are, with but few exceptions, not mine investors, particularly in mines of the precious metals. They prefer other classes of securities. Unless the Act is amended so as to admit and encourage foreign capitalists on liberal terms to invest in our mines, the result will be that a large percentage of the mines of our Territories will remain undeveloped and dormant until we, as a nation, shall have become mine-workers and capital shall have become more abundant.

We stated in a previous issue of the PRESS that a very large amount of capital had been already withdrawn by English investors from this country. The following comprise a few of the withdrawn mining propositions which have come under our notice, where the capital had been more or less subscribed, but where the companies were "called off":

In Idaho, the Silver Mountain, Col. Mat Graham & Co., \$85,000. The Victoria Consolidated, placed by Alexander McWhealley, in London, \$1,250,000. The deeds were ready for transfer and money ready for payment when the passage of the Act and its prohibitory clause became known and understood.

In Montana, a large gold mine, 15 miles from "The Montana," sold for \$500,000.

In New Mexico, an extensive property, bought by Messrs. Richard & Chadhaven for \$2,500,000.

We are informed that one of the heaviest mine houses of London was recently negotiating for an extensive mining property in New Mexico, and negotiations had advanced to that extent that their expert, Mr. James Banallack, of Grass Valley, was ordered to examine the property and report. The "Alien Act" became a law and this trade was called off. Mr. Banallack was cabled to proceed to Mexico to examine a mine in place of the one that they contemplated purchasing. He left this city Monday, May 30th, for that purpose.

No business so rapidly develops a country as that of mining. Towns and cities spring into existence like magic, giving employment to the laborer, artisan and farmer. The rugged mountain chains and barren wastes seem destined by nature as the metallic domain most favorable for mineral deposits. The country is soon opened up by wagon roads, followed by railroads.

It is a singular fact while we are throwing obstacles in the way of the introduction of foreign capital, our near neighbors are encouraging the development and settlement of unoccupied land, both agricultural and mineral, by building railroads, and by liberal measures the Canadian Pacific railroad on the north bids fair to be a serious rival to our system of railroads that span the continent. On the south our sister Republic (Mexico) has thrown wide open her doors and offers every inducement to both agriculturist and miners to colonize her vast territory and develop her mineral resources. Her colonization laws are liberal. The code of laws governing her mines are superior to ours in many respects. It is necessary for us also to do something to get people to invest in our mines. The law referred to does not affect the States except indirectly, but the Territories have much to complain of from its enactment.

The inquest into the causes which led to the Nanaimo disaster is progressing.

Cements.

The United States produces in cement made from natural rock about 4,000,000 barrels, of 300 pounds each, every year, and there is also made about 150,000 barrels, of 400 pounds each, of artificial cement (American Portland). Notwithstanding all this, we import about 650,000 barrels, of 400 pounds each. The greatest amount is received at New York, but at this port we receive from 150,000 to 160,000 barrels a year. Both the production and the importation are increasing year by year, as it is coming more largely into use.

Manufacturers in this country are seeking to improve their products in order to compete with foreign supplies. All hydraulic cements require an especially dry atmosphere, yet even that will not always retard deterioration. It has been shown by long and constant experience that both domestic and foreign cements, when allowed to remain in store for a long period, no matter how dry the location, are sure to absorb some moisture and undergo chemical changes that must gradually impair their setting and hardening qualities. On the other hand, there is danger that unburned cement, especially the artificial product, may contain an excess of free caustic lime that can only be removed by careful air-slaking, and would seriously threaten the solidity of work upon which it might be used if it passed directly from the factory into consumption.

All producers and consumers are now convinced of the necessity for a standard test and grading, and are arranging for that end. Portland cements are receiving some very critical scientific attention, and these properties are becoming better understood than any other similar product. People who buy are testing briquettes of cement more than was formerly the case. An English scientist, after a detailed statement of methods and tests employed, reaches the following deduction as indicating the prerequisites of a first class cement:

1. *Fineness.*—To be such that the cement will all pass through a sieve having 625 holes (25x25) to the square inch, and leave only 10 per cent residue when sifted through a sieve having 2500 holes (50x50) to the square inch.

2. *Soundness.*—That a "pat" made and submitted to moist heat and warm water shall show no signs of blowing in 24 hours.

3. *Tensile Strength.*—Briquettes which have been gauged, treated, and tested in the prescribed manner shall carry an average tensile strain without fracture of at least 175 pounds per square inch at the expiration of three days from gauging, and those tested at the expiration of seven days from gauging shall show an increase of at least 50 per cent over the strength of those at three days; but the briquettes broken at the seven days' test shall carry an average tensile strain without fracture of at least 350 pounds per square inch.

Such a specification meets all requirements and satisfies the peculiarities of nearly all cements except, perhaps, the very quick-setting ones, for which a slight variation in the tensile strength and the percentage of increase between the dates mentioned would have to be named.

THE members of the Marshall Monument Commission have visited Coloma. The monument is to be erected over Marshall's grave, on the summit of Marshall hill, overlooking the beautiful town of Coloma. The monument is to be massive and of great height. The material to be used is granite from the quarries in the immediate vicinity. Proposals will be advertised for as soon as the specifications are made and the title to the ground and roadways secured.

A SPECIMEN of coal several feet thick has been taken from the coal mine near San Miguel. The vein proves to be 14 feet thick and has been tunneled for 60 feet, showing 30 feet of solid coal. The Pacific Improvement Company is developing the mine for its own use as rapidly as possible, and will store the coal at San Miguel.

QUICKSILVER.—The shipments of quicksilver from Calistoga to San Francisco in the month of May were larger than usual and amounted to about 38,000 pounds. Prospects at the quicksilver mines have improved a little lately.

DURING a recent fight in the Yukon country a miner was killed and five were wounded by Indians, who lost five killed, besides having several badly wounded.

Shasta County Mines.

The South Fork Mining District.

The South Fork mining district is situated in Shasta county, California, and on the south fork of Clear creek, which heads in the Shasta range of mountains, and whose waters find their way through Clear creek into the Sacramento river. These mines lie about 20 miles west from Anderson, a thriving town on the C. & O. R. R., 222 miles north from San Francisco, and may be reached in a day's travel from the city. The South Fork district lies on the eastern slope of the Shasta range, and extends from the divide on the west to the Sacramento plains on the east. Its area is about 60 square miles; mean altitude 2000 feet. The surface is rugged, being cut by many gulches and deep canyons which carry more or less water. The principal streams of the district are Andrews and Eagle creeks and South Fork, the latter carrying from 40 to 60 miners' inches throughout the dry season. Covering at least two-thirds of this district on the east the formation is slate, although on the extreme eastern border some lime is found. To the west, and as you ascend the mountain, the formation is granite and porphyry, granites predominating.

The accompanying map shows the features of South Fork district, with the mines. The numbers refer to locations, as follows:

1. Peerless.
2. Monte Cristo.
3. Alma.
4. Crown Point.
5. Lucky Bill.
6. Continental Consolidated.
7. Odessa.
8. Hope.
9. Chico.
10. Chico North.
11. Dayton.
12. Smith.
13. Florence.
14. Great Falls.
15. Manzanita.
16. Manzanita North.
17. Blue Bell.
18. Lone Star.
19. Wright's, J. P.
20. Pacific.
21. Cold Spring.
22. Tornado.
23. Golden Eagle.
24. Little Giant.
25. Wright's, J. P.
26. Grand Central.
27. Brown & Zoellner.
28. Big Central.
29. South Chicago.
30. Chicago.
31. North Chicago—Pat'd.
32. Live Oak.
33. Knab's.
34. Red Warrior.
35. Woodfill's.
36. Cincinnati.
37. South Crystal.
38. Crystal.
39. North Crystal.
40. Arizona.
41. Confidence.
42. Black Prince—South.
43. Black Prince.
44. Flicker.
45. Hardscrabble Hydraulic Mine—present works.
46. J. P. Jones' Ledge.
47. Buena Vista.

The principal ledges of the district are found in the granite, varying in width from a few inches to 100 feet, the vein matter consisting of ore, quartz, spar, clay and talc. Generally their walls are well defined and mostly lined with a clay gouge. Their general bearing is to the E. N. to N. E. Their dip is to the east at angles of from 10° to 25° from the perpendicular. Many of the more prominent ledges can be traced several thousand feet, but generally the outcrop is not bold, owing to the extensive disintegration of the country rock.

The ores of the district are: A, free gold in quartz gangue; B, free gold ochreous (decomposed sulphurets); C, gold-bearing sulphurets; and D, ores carrying variable proportions of gold and silver, more or less refractory, the bases being pyrites (iron and copper), blende galena and fahlore, some of these latter ores carrying a notable percentage of native sulphide, horn and ruby silver.

Of Class A the Flicker, without doubt, stands in the lead as producing the richest ores at present being worked in this district, ores from this mine having milled as high as \$1 per pound.

The principal mines of Class B now being

worked are the Hope, Falls, Manzanita, Big Central, the Pacific group and Wright's group and a few others of lesser note. The ores of this class are worked by arrastra process and yield from \$20 to \$100 per ton.

There is being no effort made to produce ore of Class C, except in assessment work, there being no mills for their reduction at present, short of San Francisco. The sulphurets from these ores are high grade, ranging from \$400 to \$2000 per ton. The possible output of ore of this class from mines within one mile of the Pacific can be safely estimated at 50 tons per day for 10 years, and will only ores that paid better than \$25 per ton.

Of the mines coming under the head of Class D, that are being exploited, are the Crystal, Chicago, Chico, Red Warrior, Dayton and Continental Consolidated, and Arizona.

The Chicago lode has been worked more or less for the past 12 years, and with varied success. Many tons of its ores have been shipped

At the breast of this drift a stope has been made 15 feet in height to form three benches of five feet each. All of this work is in ore, the ore body averaging from four to six feet.

The surface indicates this ore body or chute to be over 200 feet in length and the ledge 20 to 60 feet in width. To the face of the lower drift the ore body averages five feet, and a crosscut here of 16 feet shows another ore body of two feet equal in high-grade quality to the main ore body.

The amount of high-grade ore now on the dump aggregates 250 tons, of an average assay value of from 50 to 80 ounces per ton. South from this work 350 feet, and 100 feet lower, a working tunnel is being drifted in on the ledge, and is now in 30 feet. The ledge here shows 12 feet between walls, the ore body showing a width of 40 inches, of an average assay value of 20 ounces.

The Continental Consolidated property consists of two claims of 1500 feet each in length.

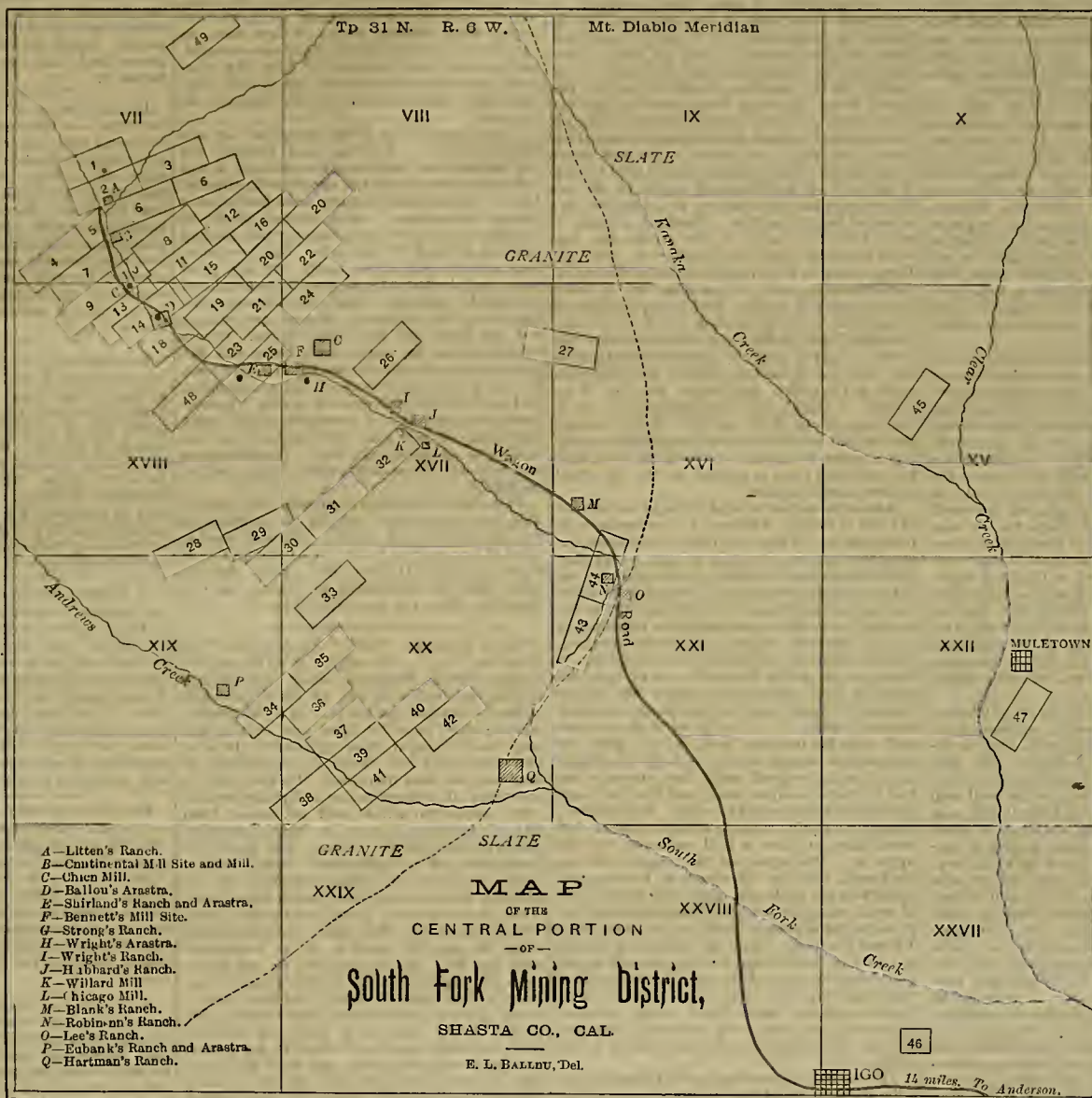
to put up reduction works in the camp at once. The ores are in unlimited supply, and of unusually average high grade, and there is every facility in the way of wood, water and accessibility for their cheap reduction. Col. Gihney has made a rich and extensive strike in the Arizona, and is taking out splendid ore. John Wright is sinking on the pay chute in his mine with splendid prospects in free gold. His ledge is from 14 to 20 inches, and is increasing in width and richness as work progresses. He has explored the pay chute for 70 feet along the ledge and worked the ores in his arrastra, and the yield has been over \$50 per ton. The Shirland Bros. and Hubbard keep their arrastra running constantly, and are making new and rich developments in their mines every day. E. L. Ballou has just completed a new lower tunnel in his Manzanita mine, and cut the ledge 150 feet below the surface, which has developed a large body of rich ore. His arrastra runs night and day. At the Continental, work is progressing

as usual. Some new timbering is being done and preparations being made to continue the lower or 200-foot level. There is a large amount of high-grade ore on the dumps at this mine, and immense amounts uncovered in sight. A rich body of chloride was struck in a new opening near the summit of the ridge last week which has created quite a stir in the camp. The outlook for the camp is very encouraging. Prospectors are getting quite numerous, and new finds are the order of the day.

Mining operators are beginning to visit the mines, and are astonished to find such large ore bodies. Several large sales are reported as on the eve of consummation. What is wanted to make South Fork boom is reduction works, where the miner can take his ores and get them worked, or sell them outright. There is an opening here that will repay a thousand fold on the amount of capital that would be required to put up the necessary plant.

MINING PATENTS.—Notice has been received at the United States Land Office that patents have been issued to the following mining claims: Georgetown mining district, Yankaley placer claim; Iowa Hill district, the Insolvent and Dolly Varden placer claims; Ophir district, the Morning Star quartz lode claim, the North Star lode claim and the Middle Star claim; Bird's Flat district, Atlan's placer claim; Oak Bar district, Blue Lead placer claim; Foreman's district, Thorpe lode claim; Sierra County district, Black Jack quartz lode; North Bloomfield district, De Noon placer claim; Meadow Lake district, Johanna quartz lode; Cinnabar district, Carr quicksilver lode; French Gulch district, Cornet Gold quartz lode and the Shea placer claim; Low Divide district, Mountain View Chrome Iron No. 2; Calistoga district, Ida Easley lode claim; Patterson district, Great Western lode claim.

THE RIVER MILLS.—An Empire City correspondent of the Carson Tribune says: "The Santiago mill is not shut down for repairs, as reported in some of the papers." He says: "There is not a stamp hung up from the Mexican mill to the Eureka. The total number being Mexican, 44; Morgan, 40; Brunswick, 56; Vivian, 16; Santiago, 38; and Eureka 60, or 254 in all."



to San Francisco and Denver and worked at a profit, while much more has been worked on the ground by the roast-chlorinating process. This mine is practically worked out above the 280-foot level. Below this level prospecting is going on.

The Chico lode cannot be considered fairly prospected as yet, but sufficient work has been done to show a strongly defined ledge and a large body of high-grade ore. The same may be said of the Crystal, Warrior, Diamond, and Dayton. Ores from all the prominent ledges of the district have been worked in San Francisco, Denver, and even Swansea.

The Continental lode has been prospected for 3000 feet with open cuts, tunnels, drifts and shafts, proving it to be one of the largest ore fissures in the district, with well-defined walls lined with gouge and filled with immense bodies of high-grade ore. The principal developments are: A drift tunnel of 25 feet, tapping the ore chute at 50 feet; 50 feet below this another tunnel is driven in on the ore body 110 feet; at the mouth of this tunnel a shaft is sunk 50 feet, and from this level a drift pierces the ore body 50 feet.

In addition to the above information, which we take from a report on the district, a correspondent sends us the following concerning the mining situation at present:

Mining matters are looking up in this district. New mines are being opened up and the work of development is being diligently prosecuted in many of the old ones, and large quantities of high-grade ore is being uncovered. At the Black Diamond, Robinson & Co. are taking out some very fine ore, which they are sacking for shipment. Oampell & Co. are hauling two carloads of ore to Anderson for shipment to the Reno works. One carload is from the Chicago mine, and assays way above \$150 per ton. The other carload is from the Crystal mine, and is also very fine ore. These parties propose to continue shipments as fast as they can extract the ore. The favorable rate of \$4.70 railroad freight, and the freight from the mines to the railroad being \$4 per ton, makes it possible to ship large quantities of ore profitably. The Continental owners are also preparing to ship ores, besides several other parties. It is to be regretted that the miners cannot get capitalists

MECHANICAL PROGRESS.

Mechanical Foolhardiness.

Carelessness kills more mechanics than old age or disease, and the number of accidents resulting from somebody's carelessness cannot be estimated. There is not as much danger in doing risky jobs and undertakings as there is in the every-day risks which are met with a contempt brought about by a long acquaintance therewith, and which are hardly regarded as risks by the men who take them. The architect takes risks which are needless when he guesses at the strain to be overcome by beam or truss, and also, and doubly so, when he also guesses at the strength of that beam or truss. The builder in turn takes a risk when he passes defective construction with the guess and the hope that "it will hold." In driving a piling for a block of houses in Harlem, the writer noticed that some of the piles were driven 12 to 20 inches by the last blow of the hammer, and he wondered at this risk taken by the builder for the sake of saving a few dollars thereby. In building a railroad bridge in New Hampshire, the contractors put down piling where the last blow drove some piles four feet! In this case some piles were driven too far, whereupon the risky, rascally contractors laid hold of said piles and pulled them up again until they were in the required position.

In erecting buildings, hundreds of risks are taken by the workmen themselves, by the owners, and by the builders also. In erecting machinery, too, risks continue to be taken, and after the machinery is running it seems almost as if the attendants vied with each other in courting danger. Begin with the fireman. How many times will he risk his life by guessing that the safety-valve is in perfect order, or that the combination water-gauges pipes is not plugged up! All too often he will guess that his boiler is safe, and run with dirt, leaks, corrosion, and he knows not what else, in that straining and groaning iron shell under which he shovels coal.

Why is all this? we may well ask. Is the man a lunatic? Is the man a fool, or what is the matter with him? There are just two other causes which may affect his behavior, for he may be lazy or avaricious; then in this latter case he is a villain as well. The architect was lazy; he didn't figure because it was easier to guess. The builder who drove the piling was a knave. He did this in order to make more money out of the job; but the workmen who get maimed or killed, the fireman who lets his safety-valve get stuck, he is sometimes a fool, but more often these things happen through pure laziness, and laziness alone. The engineer who almost hourly exposes himself by walking under the expend belt from his engine, this man is lazy; but he is abetted in his laziness by knavery, in shape of an avaricious owner, who grudges the few dollars necessary to box up the dangerous place, and thus relieve the lazy man's temptation.

Lazy men run all sorts of risks in putting on belts, in fooling around moving machinery and in monkeying with running tools, such as circular saws, planers, and molders. The man who crawls around exposed machinery to oil or clean the same, when he can just as well stop the machine before exposing himself, this man deserves to be sent up for ten days for every offence. Only a few days since, a party of masons were building a 100-foot mill chimney. They had got up 18 feet, when all at once the whole party were on the ground among bricks, mortar, and splintered lumber, with two of their number seriously hurt. An examination showed that in nailing on the last course of ledgers, only one nail had been put into some of the posts where six should have been driven. Here was a clear case of laziness and foolishness combined, with the poor consolation—to the victims at least—of knowing that only themselves were to blame. Sometimes this carelessness becomes criminal, and is occasionally brought to justice; and lately, where knavery is the cause of accident, it has been frequently severely punished. There is no excuse for exposure to such accidents, and every man can educate himself out of it if he will.

Familiarity is one great cause of a man getting careless and lazy. He works around machinery so long without accident that he thinks, if he thinks at all about it, that he knows all the ins and outs, all the dangerous places and death-traps, so he will not have to be so continually on his guard. It is a good deal of work to keep his thoughts on his fingers all the time, so our man gets a little lazy, goes too near a quick-running belt, and the first thing we know he is a subject for the surgeon or undertaker. Well, the writer remembers a man who was set at work running a circular saw. This man was mortally afraid of the saw, and kept as far from it as possible. For 23 years the saw was operated by this man without accident, until one day he dropped his rule beside the saw, and attempted to pick it up without going back to the table. He got three fingers and his thumb cut off, all through a little laziness in not taking proper pains against accident.—*Journal of Commerce.*

IRON SLEEPERS IN FRANCE.—After hesitating for some time, the French railway companies appear to have come to the decision to give the iron sleeper a fair trial. Extensive orders will shortly be given out by the various railways for cross-ties of that material. The Chemin de

fer Paris-Lyon-Mediterranee has already ordered 35,000 sleepers of the Vauthier section for its railways in Algeria. The Chemin de fer du Nord has, in consequence of the favorable results obtained with the Sversc sleeper on its Belgian lines, invited tenders for 10,000 sleepers of that pattern, and further orders will probably follow. The other French companies appear to be moving in the same direction, and are experimenting with metal sleepers in various sections. The French administration of State railways is taking the lead, and has ordered experiments to be made with iron sleepers on an extensive scale, which will tend to determine the practical value of the several systems advocated. The influence of this new departure upon the French iron trade in particular will be unmistakable, and impart the much needed activity, for with the iron industries of other countries, that of France has suffered considerably from the prevailing depression.

The Fly-Wheel.

While most people who know what a fly-wheel is have a general idea what it is for, a minute knowledge of its functions and how they are accomplished is much less universal. A very good idea both of its office and how it should be proportioned to it may be gathered from imagining oneself trying to run a foot-lathe with an extremely light fly-wheel. The motion of the machine would be jerky, the speed being excessive when pressure was applied to the pedal, and immediately slowing up because the fly-wheel did not possess momentum enough to carry it at speed up to the point where pressure again applied would tend to help it onward. A double-acting engine of the ordinary type has two chances to push the fly-wheel at each revolution. Even when steam is carried the full length of the strokes the forward tendency upon the fly-wheel is not uniform, owing to the irregular action of the crank and connecting rod. When these are in line, or the engine is on the center, any amount of pressure upon the piston will not tend to turn the wheel, and as the engine moves forward the effect of a given pressure upon this wheel gradually increases toward the middle and decreases again as the piston approaches the end of its stroke. When an engine is considered in which the steam is cut off at one-fifth of the stroke, and in addition to the above irregularity a varying pressure is introduced, it will be seen that the impelling forces as applied to the fly-wheel is somewhat irregular.

A mass in motion always contains an amount of force in inertia, which may be expressed in foot-pounds. When we run a foot-lathe, as considered above, we apply enough energy during the downward motion of its crank to run it for a full revolution, i. e., not only to drive it down but to return it, while no force is being applied without too material a reduction of speed. When an engine is properly designed, the fly-wheel is considered with reference to the speed at which the engine is to run, and made of such weight that when the engine changes its speed from its highest to its lowest running speed, i. e., its speed with no load and with its heaviest load, it will give out foot-pounds enough of force to keep the engine in motion up to speed until the governor has had a chance to adjust itself, and the increased pressure of steam to get to work. For instance, suppose an engine running without load at 100 revolutions to have a load suddenly thrown upon it. The speed of the engine will be slackened, but the fly-wheel, in lowering its speed two per cent, will give out foot-pounds of work enough to keep the load going until the pressure has adjusted itself to the new load. Viewed the other way, a fly-wheel may also be so heavy as to be sluggish in responding to the governor's action, and we can see the error of applying wheels indiscriminately, and also that there is a proper speed for a nicely designed engine to run, and any material departure from it will interfere with the accuracy of its work.

The accurate determination of the weight of a fly-wheel, with all the moving parts which affect it, involves considerable figuring. Approximations have been made for ordinary use. Watt made the fly-wheel to store up the work of $\frac{7}{8}$ strokes. Bourne advises that it should store up the work of six strokes, and modern practice upon engines of fine regulation rates higher than either.—*Boston Journal of Commerce.*

MECHANICAL TESTS.—The Department of Mechanical Engineering of the University of California is now prepared to test materials for tensile and compressive strains, elongation and limit of elasticity. All tests which yield results of practical value to the public at large will be made gratuitously, and the right is reserved to publish or exhibit the results. Tests will not be made when, in the opinion of the professor in charge, the object does not appear of sufficient importance to warrant this expenditure of time and labor.

CARBOLIC ACID is now recommended for moistening the tools with which metals are worked. The efficiency of the grindstone is even said to be increased by the use of the acid. The dark and impure acid can be used for this purpose.

TO REMOVE VARNISH FROM PAINT.—To remove varnish without injuring paint, brush on spirits of ammonia or hartshorn, which softens the oil, allowing of its being rubbed off easily.

SCIENTIFIC PROGRESS.

The Locomotive as a Weather Indicator.

An English observer says that the manner in which waste steam from a traveling locomotive conducts itself after leaving the chimney indicates very accurately the amount of moisture in the air. He says:

"Does the vapor linger in the atmosphere as if undecided whether to disappear or not, then saturation point is not far away. On the other hand, if it is snatched up with avidity, depend upon it, it is a dry day, with no chance of falling rain. Dwelling within a league of one of our main lines, I can testify of these variations from numerous observations. I have seen, on a hot summer's day, passenger trains rising an incline near our station, and therefore under full stroke of steam, without giving the slightest indication of their motive power, vomiting no smoke at the same time. At another time I have just had time to detect it ere it vanished. At others it has been visible for three or four yards, then for the whole length of the train, and so on, finely stretching, on damp and wet days, a long distance away. I have seen, in the height of summer, steam hang about considerably, with large patches of blue sky overhead—a curious revelation to me at first. Indeed, this hygrometer is a very delicate informant."

"And some of the daily variations are not less remarkable. Working in a hayfield one day last summer, adjoining the railroad, I was determined not to let the opportunity slip by. Up to 1 o'clock each passing train had given a gloomy appearance, which seemed likely to continue, the sky being overcast, while the hay or grass refused to be made. But, somehow, soon after the sun burst forth, the sky grew clear, and the trains began speedily to prophesy, if it can be called so. Gradually the steam disappeared, the afternoon became exceedingly hot, and never did hay make faster. It was carried in that day; of course, there was the same moisture in the air as before. The sun, in raising the temperature of the atmosphere, had made all the difference in giving it greater absorptive powers. A fortnight in the early hay season of last year was declared by this test to be phenomenally dry. Washerwomen and farmers, please note when living near a railroad."

This observer's conclusions seem very reasonable, and they could probably be verified by the observations of others. Without doubt, some of our readers have noticed something of the same kind. If they have, their observations may be of interest to others, and we would be pleased to hear from them.

STILL ANOTHER "NEW" EXPLOSIVE.—THIS TIME FOR COAL.—"Securite" is a German invention for an improved, cheap and efficient blasting powder, made out of the by-products of coke ovens and gas works. It is, weight for weight, more powerful than gun cotton, and very much cheaper than dynamite. It is in two forms, and the chemical composition of both may be thus described: Its first form is a mixture of dinitrobenzene or trinitrobenzene with ammonium nitrate, and its second form either dinitronaphthalene or trinitronaphthalene with ammonium nitrate. The powder is granulated, of a light-yellow color, with a smell like that of bitter almonds. When brought into contact with fire it burns, and, while burning, melts, giving out a yellow flame with little smoke. This flame is extinguished when the powder ceases to be in connection with the fire. No blows ignite it, and it can only be exploded with a 1000-gramme cep. From a large series of tests it has been conclusively proved that securite may be safely exploded in the presence of fire-damp and coal dust, and even when used where 10 per cent of fire-damp was mixed with the most dangerous coal dust no flame appeared. It can be safely carried from place to place, and the English Government has authorized its importation.

THE STORAGE OF ELECTRICITY was the subject of a lecture recently delivered by President Morton, of Stevens Institute, before the American Gas-Light Association. Electric lighting has been carried on successfully without storage, but only by the use of very accurate machinery, extreme care in its management and the use of a much larger plant than would be needed but for the fact that the electricity must be produced immediately before it is consumed. Such a system is, of course, very expensive, but thus far storage systems have been even more costly. Professor Morton says, however, that good storage batteries are now produced, and that their convenience will make a market for them in spite of their cost. They are particularly useful in regenerating the work of a dynamo, providing a steady current in spite of the variations in its work. They are used, also, where expense is no objection, for the lighting of private houses by electric light, a gas engine furnishing the power and the electricity being stored during the day for use at night. Professor Morton tells of storage battery cells that have been in use for two years without deterioration, except from causes which may now be avoided.

SOME ALLEGED NEW ELEMENTS.—A. Pringle claims to have discovered six new substances in

some lower silurian rocks in Selkirk. Five are said to be metals, and the other is a substance resembling selenium, and which he calls hesperium. One metal is like iron, but does not give the rhodanate reaction, nor that with tannin. Another resembles lead, is quite fusible and volatile, and forms yellow and green salts; another is black, and he names it arebodium; the fourth is a light-gray powder, and the last is dark in color. For three of these elements, the author assigns the equivalents 95.4, 43.6 and 74.

A SINGULAR ACCIDENT.—The newspaper, *Fire and Water*, relates a singular accident, which came near being serious. In a dyeing establishment near New York City a man was cleaning a flannel gown in a tub of beezoe, fully 100 feet removed from a flame of any kind. He was simply rubbing the garment with his bare hands, when, as he describes it, "suddenly the whole tubful of stuff went up in a blaze," and he escaped death or serious injury only by an instinctive and instantaneous backward leap. The friction caused by handling the flannel generated electricity, which ignited the vapors arising from the benzene. This, the editor says, is in its detail the first instance of the kind which has yet come to our knowledge, and the fire having been quickly extinguished by the employees, would probably never have been reported had not one of them casually mentioned it.

PECULIARITIES OF THE MERCURIAL THERMOMETER.—A mercurial thermometer held in the sun's rays, and not in contact with any other body, will show but little rise in temperature, the radiant heat being reflected from the bright surface of the mercury like light from a mirror. But if the bulb be coated with lampblack or some absorbent of heat, a rise in temperature will be indicated at once. So the heat rays from the sun may be passed through lenses of ice and concentrated to a sufficient degree to ignite combustibles placed at the focus, without melting the ice of which the lens is formed.

ENORMOUS SNOWFLAKES are recorded as having fallen Jan. 7, 1887. A writer in one of the magazines publishes measurements of single flakes $2\frac{1}{2}$ inches in length, $2\frac{1}{2}$ inches in length, $2\frac{1}{2} \times 2\frac{1}{2}$ and 3 inches thick, and even $2\frac{1}{2}$ and 4 inches in length. When melted, the largest one yielded 16 drops of water, and many gave 14 or 15 drops. The storm was only a few minutes in duration. These unique results can only be accounted for by the fact that the temperature was 32.6° Fahrenheit, and hence several ordinary flakes might become congealed to form a larger one.

A LONELY FLOWER.—On Mount Whitney, the highest mountain in California, at a level of 14,000 feet above the sea and 1500 feet above the timber line, where there is no soil and no moisture save snow, and hail, and ice, there grows a little flower shaped like a bell-flower, gaudy in color of red, purple, and blue. It is called Jacob's ladder, and its fragrance partakes of the white jasmine. It blooms alone, for it not only has no floral associates, but there is no creature, not even bird or insect, to keep it company.

HOW ELECTRICITY IS ENGENDERED IN A THUNDER STORM.—Sohneke states that the electricity which is discharged during a thunder storm is produced by the friction of water and ice, that is, that the ice is electrified by friction with water. Just before a thunder storm water clouds (cumuli) and ice clouds (cirri, cirrostrati) appear simultaneously in the sky. The friction of these particles of ice and water is a sufficient cause of the electricity which is generated.

A VALUABLE RECIPE.—The true French polish is one pint of spirits of wine added to a quarter of an ounce of gum opal, the same of gum arabic, and one ounce of shellac. This polish is used for plain wood that has been stained in imitation of natural wood. The principle of action is the floating with oil the gummy or resinous substances into the pores, and bringing the polish up by rubbing. The simplest varnish is a solution of shellac dissolved in naphtha.

MOUNTAIN AND CITY ELEVATIONS.—The Rocky mountains rise at various places to a height exceeding 11,000 feet. Of the 20 most famous passes, only seven are below 10,000, while five are upward of 12,000 feet; and one—the Argentine—is 13,000 feet. Of the 73 important towns in Colorado, only 12 are below 5000 feet, 10 are over 10,000 feet, and one is 14,000 feet.

EVERY INSECT HAS ITS USE.—Mary E. Tousey, on the study of insects in the *American Teacher*, concludes that every insect has its use in the world. Many live very romantic lives—some are wanderers and some are social in their habits; all are wonderful. It is possible for us to discover the secrets of their lives and the mysteries of their homes, if we carefully study them.

APPLICATION OF ELECTRICITY TO A WEAVING PURPOSE.—A manufacturer of Roubaix has invented a very curious application of electricity to looms. He adopts an indicator which strikes when a thread breaks, and thus saves the weaver from the close attention to the quickly moving threads which is so injurious to the sight.

ENGINEERING NOTES.

The Hudson River Tunnel.

After a resting spell of four and a half years, this great undertaking has been again opened, and one of the headings is being extended as rapidly as possible through the bed of the Hudson. Although all of the four headings will be worked simultaneously, the principal endeavor will be to complete and open the north tunnel, which is about two-thirds finished. The method of building this tunnel has not been changed. Compressed air is relied upon to keep the heading free from water, and the tenacity of the wall of silt is depended upon to separate the air and water. The heading is excavated as fast as the plate-sheathing and masonry can be put in, while the pilot is kept from 15 to 20 feet in advance of the heading, and thus serves as an explorer into the nature of the material ahead.

The work is of decided interest from an engineering point of view, as it introduces, and, what is more important, practically tests a new and novel system of tunneling, which, so far at least, has proved to be efficient and economical. The tunnels, once completed, will be invaluable to the commerce of this city, and they will provide sure and rapid connection with all the great railroads terminating on the west side of the Hudson river, opposite this city.

We understand that all the capital necessary has been secured, and all financial stumbling-blocks have been removed. We congratulate Mr. D. C. Haskin, the inventor of the system employed in the tunneling, upon his indomitable energy and perseverance in surmounting the many difficulties he has encountered, and hope that his anticipations in respect to the result of his grand engineering enterprise will be fully realized.—*Scientific American*.

THE ENGINE OF THE FUTURE.—Mr. Angus Sinclair, editor of the *National Locomotive and Car Builder*, delivered a lecture recently, at Cedar Rapids, Iowa, before the employees connected with the Burlington, Cedar Rapids & Northern shops. After referring to the attainment to the highest degree of perfection in an engine by effecting the transportation of steam into work, the speaker continued by saying that the great object sought was to make an engine which used the least steam and required the least repair. The locomotive engine while it is imperfect in its use of steam, yet compares favorably with other engines. He spoke at some length of the great difficulties of getting the motive power economically out of coal. Electricity has of late years been forced to the front as a motive power, although it is not itself a prime motor like the locomotive, wind and water, gas and hot-air engines. Electricity must first be developed by the use of an engine and dynamo. At present we are compelled to use coal to develop steam with which to move the engine by which the dynamo is driven. About 50 per cent of the motive power of steam is consumed in the transmission to the dynamo, and thus is seen the great waste of steam in the production of electricity. If electricity could be generated without the great expense of steam as now required, a great saving would result, but under the present process but little more than five per cent of the coal used in our furnaces is now put to work and utilized in the moving of machinery. Thus it will be seen that the great aim in the manufacture and management of engines is to get the largest percentage of the coal converted into working power.

RAILROADS IN INDIA.—The first railroads in India were modeled on the English lines and were very solidly and expensively built, but experience has taught Indian engineers that, with the exception of a few important lines of traffic, such roads could not be expected to return interest on their cost, and there has been a gradual reversal of the original method and a substitution of a cheaper style of road. The old methods still survive to some extent, however, and in the last year or two some very expensive works have been undertaken. River crossings have always been among the most difficult problems with which engineers in India have had to deal, and there are probably few countries in the world with an equal mileage of railroad which have more large and costly bridges. More than one of these, it is claimed, could well have been dispensed with, and the capital applied to the building of needed branches and extensions. Steam ferries for the transfer of trains are now taking the place of expensive bridges, and it is only when the traffic becomes heavy enough to warrant it, or where circumstances are especially favorable, that the question of building a bridge is considered at all.

GREAT ACTIVITY AT BRIDGE WORKS.—More bridge work is projected at this date than ever in the history of the country. Two are projected across the Hudson, six across the Mississippi, two across the Missouri, a \$10,000,000 bridge across the Potomac, 4600 feet long, besides a multitude of smaller bridges. The bridge works are constantly overrun with work, and bridge iron-makers are unable to accept all the business offered. Four bridge-building works are projected, and an expansion of mill capacity is going on.

USEFUL INFORMATION.

How to Use Glue.

All the glue, as received from the factory, requires the addition of water before it will melt properly, and every addition of water (while the glue is fresh made) will, up to a certain point, increase the adhesiveness and elasticity; and it is the duty of every man who uses glue to find out just where the point lies, as it is possible to melt glue and have it so thick that after it is dry or set it will be so brittle as not to adhere to the wood. Some glue will bear more water than others, but all will bear more water than usually falls to their share, and that, too, with a greater increase in the quality of the work. For glue to be properly effective it requires to penetrate the pores of the wood, and the more a body of glue penetrates the wood the more substantial the joint will remain. Glues that take the longest to dry are to be preferred to those that dry quickly, the slow-drying glues being always the strongest, other things being equal. For general use no method gives so good results as the following: Break the glue up small, put into an iron kettle, cover the glue with water and allow it to soak 12 hours; after soaking, boil until done. Then pour it into an airtight box, leave the cover off until cold, then cover up tight. As glue is required, cut out a portion and melt in the usual way. Expose no more of the made glue to the atmosphere for any length of time than is necessary, as the atmosphere is very destructive to made glue. Never heat made glue in a pot that is subjected to the direct heat of the fire or a lamp. All such methods of heating glue cannot be condemned in terms too severe. Do not use thick glue for joints or veneering. In all cases work it well into the wood in a similar manner to what painters do with paint. Glue both surfaces of your work, excepting in case of veneering. Never glue upon hot wood, or use hot cauls to veneer with, as the hot wood will absorb all the water in the glue too suddenly and leave only a very little residue, with no adhesive power in it.

THE PHILOSOPHY OF SHOE-BLACKING.—The *Waverly Magazine* discourses as follows upon the philosophy of the very prosaic subject of blacking shoes: "Did it ever occur to you," said a chemist, "what a remarkable and unique process the blacking of a boot is? You see, he smears the boot with a preparation of bone-black, which is entirely devoid of luster, and then by the friction of a dry brush makes it shine like the sun. There is not another process like this anywhere in the arts, so far as I know, and I never read anywhere any scientific explanation of the process. I have a theory of my own, however, which I will give you for what it is worth. The key to the mystery lies in the fact that diamond is nothing but crystallized carbon. The blacking is little more than carbon paste, and the friction of a hairbrush, being one of the most efficient methods of generating electricity, has the effect of crystallizing the carbon of the blacking. As soon as this is done the boot is covered with millions of infinitely small diamonds, and, of course, begins to shine like diamonds in your shirt-front. Of course this is not a perfect explanation of the phenomenon. What part the other ingredients of the blacking play, and especially how it is that the blacking must be moistened, I cannot tell; perhaps some one else can. But I feel pretty sure that these boot-blackers are engaged all day in turning blacking into diamonds."

PROTECTING ANIMALS FROM FLIES.—At this season of the year the annoyance caused to animals by flies and mosquitoes often amounts to positive agony, and at all times, in what is called good corn weather, it is sufficient to prevent the stock eating enough to keep them in good condition. The animals will stand in the water or pass the greater part of the day in the shade, rather than expose themselves to the sunshine, going out to eat only when driven by hunger. They quickly lose flesh, the flow of milk shrinks, and a loss is incurred that cannot be easily made good again. At all times a good feed of grain is beneficial to stock, but it is especially so when flies are very annoying, since it will do much to prevent shrinkage of flesh and milk. Horses and milch cows may be protected, in a great measure at least, by wiping them all over with a sponge dipped in soapuds in which a little carbolic acid has been mixed. Bulls confined in stables often suffer enough from the attacks of flies to drive them half mad, and there is no doubt that the continued fretting caused in this way develops a savage disposition. The most satisfactory results have followed from sponging, with soapuds and carbolic acid mixed, a Jersey hull confined in a stall.—*Chicago Tribune*.

BIRDS AS WEATHER ANNOUNCIATORS.—Quite a number of birds announce the coming of rain: for instance, the magpie, the owl, the yellow thrush, and the greenfinch. This is also done by means of peculiar notes which they never sound on other occasions. Nicolardot has said to reproduce these notes by letters. There are also storm-birds, so called *procellaria*, which in a similar manner—that is to say, by the use of certain peculiar sounds—predict the coming of a storm, even a long time in advance. Birds thus can feel and announce the coming of rain

and storm, and the ancients ascribed to them the faculty of prediction. In their flight and in their voices indications of coming events were sought. The augurs of old had established a whole science of the flight and the voices of birds. Nor is it improbable that training was resorted to, to aid in procuring such predictions—that is to say, to create favorable or unfavorable omens, which might happen to best suit the plans of the priests at the time. Louis Napoleon, in our nineteenth century, intended to convince the French people, by the aid of a trained eagle which was to have alighted on his head at the right moment, that he was the predestinated successor to his great-uncle.

TO CLEAN FEATHERS.—Make a lather of curd soap, boiling water and pearlsh; when it is a little cool, wash the feather in it, gently squeezing it. Wash it again with less lather, and then rinse it in cold water, shaking it well before the fire, but not too near. Curl it by drawing each fiber over the blunt edge of a fruit-knife. If the color is not good, use a little blue in the rinsing water.

BALLOONS FOR CHINA.—Two balloons ordered by the Chinese Government have just left Marseilles for Tientsin, accompanied by a French aeronaut, who is to teach the Chinese officers how to manage them. One balloon is 6000 cubic meters (2,118,000 cubic feet) in volume, and the other 3000 cubic meters. They are evidently to be used for war purposes.

WASHING LAMP CHIMNEYS.—Housewives should not waste their time every morning in washing lamps and chimneys, but should rub the lamps with an old piece of flannel, and hold the chimneys over a kettle of hot water until they are steamed well, then rub quickly with a dry cloth.

A MILK-FED POMPKIN.—One of the peculiarities of a 250-pound pumpkin grown at Newburgh, N. Y., is that it was fed on milk. A root was sent out from the vine to a basin of milk, and it consumed a pint of the fluid each day.—*Chicago Times*.

GOOD HEALTH.

The Cancer Discussion.

We this week place before our readers another case of cancer, in which the treatment appears to have been very successful.

Mrs. M. A. Meroer, age 54; five children, youngest 20; residence 303 Van Ness avenue. No cancer in family. Five years ago was crushed by fall from a wagon; a lump, size of hazel nut, remained after discoloration had disappeared; no pain at this time; health failing; glands not enlarged. Eighteen months after, attended by Dr. Bazan; he pronounced it cancer and proposed to remove breast. Dr. Sawyer said: "It is a cancer; the sooner you get rid of it the better." Dr. Kane said: "It ought to be taken out." Dr. McLean said: "The sooner you get rid of it the better." Dr. Murphy: "Should be taken out." All these medical gentlemen pronounced it cancer. The patient would not submit to an operation, so determined to apply to those who proposed to cure cancers without a knife. Lump in breast was now the size of hen's egg, painful and growing more so, and larger. Heard of a Chinese who claimed to cure without operation; six weeks with him; obtained no relief. Went to Franklinberg, who tried to cure her by plasters and caustic, but only caused pain; no relief. Went to Kelly Tiggs, who claims to cure without a knife; attended with him for three years; suffering great pain at times, but getting worse all the time, when she heard of — placed herself under treatment February 22, 1886, and left off attending May 15, 1886. Suffered no pain when under the care of —, and improved steadily right along. Breast healthy; looks and feels well.

Will the medical gentlemen above named deny that this was a genuine case of cancer? or did they all make a mistake in their diagnosis? Is not human life and suffering worth an hour's time on the part of one or more of these gentlemen to determine the truth in this case? Are medical ethics of more importance than human life?

REGULAR EXERCISE.—It is generally admitted, but not always acted upon, that, second only to the nourishment of the blood by food, regular exercise regulates the action of all the vital organs. Exercise which is undertaken spasmodically and at uncertain intervals is injurious rather than beneficial. Judicious exercise for brain-workers is that which causes the blood to flow freely, and affords a change of position and action to the cramped and wearied muscles, in addition to some slight interest calculated to insure a change of thought and consequent relaxation to a tired brain. It should be taken out of doors and in the sunshine, if possible. The best time for gentle outdoor exercise seems to be about mid-afternoon, if it can be taken without exposure to excessive heat, the sunlight having chemical properties which act tonically upon the system. Early-morning exercise has been favored, but it is as much to be reprobated as early mental or physical labor, because at that time vitality is at its lowest ebb, and it needs stimulation rather than further depletion. Failing open-air exercise, absolute purity of the

surrounding atmosphere is imperative, because its respiration furnishes to the blood that quantity of oxygen necessary to the process of destructive assimilation which restores vitality and tones the nervous system. The condition of the nervous system affects the secretion of the gastric juice, and, of course, its deficiency occasions impaired digestion. When one has been writing several hours in a badly ventilated room, or in one lighted with gas, exercise in pure air is required to supply the blood with oxygen, and thus prepare the way for the proper nutrition of the brain, nerves and muscles from the next supply of food.

The Weak Points in American Constitutions.

From the vital statistics which Dr. Billings has classified, the appearance is that the respiratory machinery is the feeble point in the American man and woman, or any man or woman who endeavors to live in our climate. Diseases of the lungs and diseases directly related to pulmonary disorders are out of all proportion to any other in their fatality. Consumption is the disease which, taken separately, kills more persons per thousand of the population than any other one disease, and pneumonia is next to it. Consumption kills 91 per 1000, pneumonia 63 per 1000, and the largest number per 1000 to which any other malady is fatal is 38. But if we class together consumption, pneumonia, heart disease and bronchitis, the fatality of this group is 191 per 1000, which simply shows that the respiratory organs are the dangerous spots—the points in our vital fortification through which the enemy gets in with greatest facility and where he does most harm. Consumption is, it is true, classed as a general or constitutional malady; but many forms of disease that are classed as consumption are especially diseases of the lungs or their plural envelopes, and all are fatal through their ravages upon this organ.

What are the causes and what is to be the consequence of the fact that the statistics thus make out? No doubt our terrible climate is the first cause. Over a widely extended part of this country the thermometer ranges from season to season through 110 or 120 degrees of the Fahrenheit scale. We have in the same cities a Russian winter and an Italian summer, and as neither high nor low temperature; but the capacity to withstand great changes from one to the other is the true trial of vital force. Our people are exposed to such a test as none other is ever called upon to endure.—*New York Mail and Express*.

EXPERIMENTS WITH TAPEWORM EGGS.—Some weeks ago this distinguished scientist, Dr. F. Zschokke, and ten of the students at the zoological laboratory, Geneva, undertook a heroic experiment for the purpose of studying the development of tapeworms in the human system, to which end they swallowed the eggs of the repulsive parasite. From every part of Europe they received letters of approbation and encouragement—one single letter only blamed them for having made the dangerous experiment, and this came from the president of a society for the prevention of cruelty to animals! The eggs had been taken from a variety of fishes known or suspected to be the transmitters of tapeworm. For nearly two weeks all went well; but in the course of the third week the presence of the unpleasant guest manifested itself plainly with most of the experimentalists. In every instance a complete removal of the parasite was effected, the specimens extracted varying in size, two or three reaching a length of two meters. Dr. Zschokke is about to publish the result of his experiment.—*New York Tribune*.

THE DURATION OF A GENERATION.—The duration of a generation is the average length of life for man. That is, though, of a million of human beings born in a generation, some will die in infancy and some will live to old age, the average life for the entire number will be about 33 years. This is arrived at by averaging the ages of all persons, old and young, dying within a term of years. Different localities, different periods, will of course alter the result, but the average for the race in civilized countries is always approximately the same. The average age of population is a different thing. This is the average age of all persons living at any one time, ascertained by summing the ages of persons of different age as given by a census of the population and dividing this by the sum total of the population.—*Inter-Ocean Queries*.

PROFESSIONAL FATIGUE.—Medical and other professional men often break down from their inability to keep a regular time for meals. An eminent doctor says: Being often out for many hours, and becoming too exhausted to digest a full meal when at length able to get it, I conceived a plan which answered admirably well, and which other doctors have gladly adopted. I provided myself with a small bottle of lime-water, which I add to a glass of milk when passing a dairy shop; or I put a small flask of the mixture in my pocket. A water biscuit with this will keep a man harmless on a long fast, and enable him to digest a meal when he can obtain it.

HOW TO COOK FISH.—Experience in a Glasgow hospital has taught Dr. J. S. Nairne that boiled or fried fish is a dangerous diet for weak persons, but that steamed fish is harmless.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador Ledger, May 29: The water in the Wildman mine has been taken out to the 300-foot level. The hydraulic pump is working nicely. Work has commenced on the North Star claim. The Amador canal has been giving a good deal of trouble in the past two weeks. It broke again yesterday, which will likely stop some machinery for a short time. The steel pipe for the Plymouth line of ditch is completed and laid. S. N. Knight has just returned from a visit to the Lambing claim, where he found his patent dredger in operation, and giving entire satisfaction.

VALPARAISO.—Ginocchio Brothers have bonded this promising mine to L. C. Taylor, a mining man of North Carolina, who represents a large amount of Northern capital. The bond, we understand, is to the effect that the purchase money is \$60,000 to be paid on or before October 1st of this year; the first installment to be paid in 30 days after date of bond. The Valparaiso has developed splendidly of late.

MISCELLANEOUS.—The 60 tons of ore from the Griesback mine in Pioneer district has been crushed at the Dane mill, and yielded 30 pounds of amalgam, so we are informed. It is thought that the gold product from the amalgam will be at least \$4,000, which would give an average of \$60 per ton. The two-stamp mill on the St. Julian mine at Middle Bar has been sold to A. J. Sargent, and will shortly be moved on to his mine near by. Underground work at the Little Amador has come to a standstill. The rock taken from the mine yielded about \$5 per ton. It was lower grade than was generally supposed. John I. Minear has bonded the Wetzlar mine in Hunt's gulch. The Amador gold mine has let a contract to sink the main shaft another 100 feet. This will carry it over 300 feet deep. The Huntington roller quartz-mill on the McKenzie claim, near Irishtown, has started up.

NEW LONDON.—Amador Ledger, May 27: This week we paid a visit to the New London mine, half a mile south of Plymouth, and were shown around the works by H. Reese, the superintendent. The mine is owned by Messrs. Ballard & Martin of San Francisco, who have also secured adjoining claims, giving them a stretch of over a mile of territory along the mother lode. As many grossly exaggerated reports have been circulated concerning the recent strike of rich ore in the shaft now in process of sinking on the New London property, it is well to state the true facts in relation thereto. There is a vast pile of good milling ore on the dump, every pound of which is intended to be worked. Indeed the ore pile is larger than the waste dump, which shows that the shaft has been more or less in ledge matter all the way down. It is in four feet of quartz at present. The entire dump is estimated to average from \$12 to \$14 per ton. When the shaft had reached about 900 feet deep, ore, richer than any that had heretofore been extracted, was encountered. The reports about a wheelbarrow full of gold being taken out were calculated only to mislead. The rich ore was not chunks of almost solid gold, but consisted of two feet of fine-looking ribbon rock, carrying a large percentage of sulphurets, and also showing streaks of free gold. Assays of this rock gave \$300 per ton in free gold, and over \$600 per ton as the value of the sulphurets, making a total of nearly \$900 to the ton. The sulphurets are the richest found in the county. It is the same kind of rock met with in the Pacific, the Keystone, and the South Spring Hill, also the old Eureka, of Sutter creek. As far as we can find out, this character of ore has never been known to be of a mere pocket nature. Of course the ledge varies in richness. The shaft of the New London is now down over 1000 feet. The new shaft, over 500 feet from the main shaft, is progressing rapidly. From 25 to 30 men are at present employed about the two shafts.

BUNKER HILL.—This mine is looking better than it has looked for years. The shaft has reached 800 feet, but the ore in the lowest level is of inferior quality and not being worked to any extent. At the 600-foot level at the south end of the mine, a large body of high-grade rock has been discovered, and it is from this level that the mill is mainly supplied.

Calaveras.

HANDSOME SPECIMEN.—Calaveras Chronicle, May 28: We were shown a fine specimen of gold taken from the Concentrator gravel mine the other day. The chip was valued at \$35. This mine is turning out to be a valuable piece of property. Over 30 men are employed in the mine, the fine ro-stamp mill is kept constantly running on rich gravel, and the deposit is apparently inexhaustible. New boarding-house, lodging-house, blacksmith shop, stable, and a nicely furnished and convenient superintendent's office have all been constructed recently. Under the thoroughly practical management of the superintendent, Mr. C. M. Burleson, everything is running like a charm.

WEST POINT.—Calaveras Prospect, May 27: About 20 men are employed in the Scorpion mine. The superintendent, John McLaughlin, is well pleased with the present outlook of the vein. The shaft is down 200 feet, and the company intends to sink another hundred feet in a short time. About 10 tons of good milling ore is taken out in 12 hours. Very rich rock has been discovered in the Lockwood mine near West Point, and the discovery has created quite an excitement. F. Novella has a good prospect near West Point. He has a patent to the mine. Two shafts have been sunk 100 feet each, and a drift between the two of about 80 feet. Last Tuesday a body of ore was found in drifting north from the main tunnel, which contained considerable free gold.

SHEEP RANCH.—Cor. Calaveras Prospect, May 27: Operations at the Wood mine have been delayed for some time in consequence of the absence of machinery ordered some time ago. It is thought that it will arrive the present week and then the work will be resumed.

El Dorado.

SPRINGFIELD.—Mountain Democrat, May 28: The Springfield is making preparations to sink the shaft to 1600 feet. Superintendent Poundstone is

bound to find what is at the bedrock of the fine quartz lead in this property. We understand that there is a 12-foot vein at the 1400-foot level. The Confidence, in Cedar ravine, recently opened, made its first cleanup this week, with good results. Thos. Davidson has made a cleanup at his mill near El Dorado, after a three weeks' run, and reports he did well.

MOUNT PLEASANT.—Placerville Observer, May 31: Jas. Ray, lessee of the Mount Pleasant mine, at Grizzly Flat, bought from W. G. Shriver, of San Francisco, the hoisting works lately used at the Sunday mine. This, coupled with the fact that about 40 men are kept at work in the Mount Pleasant, does not seem to bear out the predictions that the old mine was soon to be closed down. B. Delony, of the Middle End mines, Grizzly Flat, says the mines are looking well and being worked full-handed. The lower tunnel at the Melton is in considerably over 1600 feet, exposing a large body of high-grade ore.

AT WORK.—El Dorado Republican, May 26: Work at the Gopher-Bowler mine is being vigorously pushed, and a large amount of money is being expended by Superintendent Pearson in preparing to work the mine. Hoisting works are to be erected, and a new shaft sunk on the Boulder ledge, which is an immense body of quartz, capable of running a large mill for years, if the rock proves to be rich enough to work profitably. A large quantity of iron pipe, track rails and other mining supplies have been ordered from this city and considerable building is to be done at the mine.

Fredero.

HILDRETH.—Fine Gold Miner, May 27: The Hildreth mill has been crushing from 10 to 12 tons daily. The next cleanup will surpass the first, as nothing but first-class ore will be crushed. Louis Wilson has been compelled to stop work upon his mine on account of the increase of water in the shaft. Machinery has been ordered from S. F., which will be here shortly, when work will be commenced on a larger scale. A. McFadyen and P. P. James left for S. F. on Saturday, to order machinery of greater capacity, the present hoisting works not being capable of doing the work. Upon an average width of a four-foot ledge the development consists of a 228-foot shaft, with east and west drifts at each 100 feet that extend 150 and 175 feet of crosscut on the pay chute. The Black Hawk Co. will resume operations as soon as a pump and boiler can be obtained. Development of the McNally mine is decidedly encouraging, especially in opening up higher grade ore in the east drifts. In the 500-foot tunnel of the Last Chance mine, owned by McKenzie & Rule, an extra quality of ore was opened up last week at the face. A stope will be started in a few days, from which ore will be extracted and hauled to their ten-stamp mill. John Davis, while sinking upon his ledge, opened up quite a pay chute of ore. The prospect is very good. Mr. Crossman was in town during the week looking up the location to erect a custom quartz-mill.

Inyo.

PROSPECTS.—Independent, May 28: Some very good mining prospects are being opened in new ground in the Beaveridge district, in the Inyo mountains. In one of these claims, the True Blue, owned by C. Maysan and others, of Lone Pine, the ore carries \$296 per ton in silver. A shipment of the ore was made a few days ago. Another claim, called the Big Treasure, is owned by the same parties. This is located not far from the White Hill mine, but on the other side of the ridge. A sample of 13 tons of this ore was shipped recently; it goes \$26.50 per ton in silver and 69 per cent lead. The vein is large and easily mined. This claim gives strong evidence of developing a very large ore body.

MARBLE.—At the marble quarries recently a block of pure marble was taken out that would weigh over 80 tons. The saws are at work cutting up this block for market. Behind where this block was taken out stands a ledge 20 feet high, and as far as can be seen, without a seam. The opening of this ledge will, it is believed, supply all the large blocks that may be needed for a century to come. The third layer has been cut through and a seam found at a depth of ten feet. Some fear was felt that no such seam would be found, thus making quarrying more expensive, but that is now dispelled. Some blocks of yellow and moss-agate marble have recently been sawed and both are beautiful. The fern-like figures in the moss-agate marble are from three to four inches in length. A carload of marble was shipped to San Francisco this morning.

Monterey.

GOLD.—Pleto Cor. Monterey Democrat, May 28: The gold fever has reached this portion of the country at last, and there is a general migration of citizens to the gold mines, which are in the Burro hills, 20 miles from Jolon. They were discovered by Mr. Cruikshank, who has already been offered \$50,000 for his interest. The gold in the quartz can be seen with the naked eye, and it is thought that it will assay \$2000 per ton.

Nevada.

EMPIRE MINE.—Grass Valley Union, May 28: The shaft of the Empire is now down to the 17th level, a station has been cut out and the drifts started. This level will open up a large body of ore when the drifts are driven up sufficiently for stopping. On the 16th level the north drift has been extended 400 feet, and is nearing the pay shoot that comes down from the 15th level. The main incline is also being sunk for the 18th level, the intention being to open up new bodies of ore as fast as possible in order to keep the mill running with the full head of 40 stamps. In a few months, when more ore will be accessible, the underground force will be increased to its former complement. The late discharge of a number of miners was owing to the upper levels not furnishing sufficient ore to keep all the stamps going regularly.

THE NEW ROCKY BAR MINE.—Foothill Tidings, May 25: Messrs. Francis, Fiddick & Co., late lessees of the Perrin mine, have taken a contract from the New Rocky Bar Mining Company to clean up and repair the original incline shaft, and to pump out the mine. As there is but little water in the shaft, this work will be completed in less than two weeks. Then the contractors will doubtless lease the mine, sink the shaft, and gradually carry on the work of development.

A PAYING MINE.—Foothill Tidings, May 27: Brockington Bros. & Co., lessees of the W. Y. O.

D. mine, have recently completed a crushing of 74 loads of ore. The yield was \$2176. The ore from this vein has from the beginning yielded about the same—\$30 per load. The ledge is in soft picking ground, the greatest depth of the workings being 93 feet, and it averages 10 inches in thickness. There's lots of it in sight. The boys have their own mill, which is of five stamps and operated by steam.

Plumas.

GRANITE BASIN.—Cor. Plumas National, May 28: The prospects for a lively summer in the Basin never were better. The mills will soon be making "mashes" on rich quartz. Mr. Christie has struck the Highland Chief, in the lower tunnel, and the quartz is of the best. Mr. Graves, while sluicing near his house, found some fine nuggets. Joe Peppin is running a tunnel on his ledge. The quartz looks fine, and it does not deceive its looks. Johnnie Chatly is in the Granite tunnel, and has struck it rich. See & Jolly are still working on the Specimen, and are hopeful of good results. Swan & Williams have out a fine crushing at the Homestake.

INOIAN VALLEY.—Greenville Bulletin, May 26: Mr. S. R. Prentiss, president of the Plumas Con. M. & Co., is now making arrangements to resume operations at the mine. The legal entanglements, caused by a difference between members of the corporation, have been adjusted.

CRESCENT.—The mill at the Crescent mine was started at the first of the week. Crosscutting continues. We are informed that a ledge has been struck which prospects well. This is in hard blue curly. Some have contended that a ledge could not live in such rock, but the contrary has been proven in the Crescent. Mr. Whitney, the superintendent, works the mine upon the economical plan, pays his men promptly at the end of each month, and will, we feel certain, develop a good mine at the Crescent.

GREEN MOUNTAIN.—For years this mine has been steadily running. At times prospects were not good, but by close attention to business, economy, and perseverance, Mr. Rodgers, the superintendent, has made the mine a success. It is generally understood now that the Green Mountain has superior ore, and that good returns are being obtained. There is good feeling among the friends of the mine, and it is quite certain that a prosperous future is before it.

THE DRURY.—Geo. Standart will have the Kettle mill ready this week. A new Pelton wheel has been put in, a new 20-inch belt supplied, and other necessary repairs made. The mill will be turned over to Mr. Drury, the lessee, and crushing will begin immediately. Ten stamps will be started. The mill is now full of ore, and hauling will be continued. Mr. Drury has a large mass of quartz. Add Nev. Co.

GRAVEL ELEVATOR.—Foothill Tidings, May 28: The North Bloomfield Company is about to start up its gravel elevator. The machine lifts the gravel 85 feet, takes the gold out and deposits the tailings in the old works of the mine, from which place the tailings cannot run into any stream or anybody's ranch. That machine, according to all accounts, has the stamp of legitimacy.

San Bernardino.

DRY LAKE DISTRICT.—Cor. San Bernardino Courier, May 28: Colonel Hall has arranged for the putting up of reduction works capable of crushing 20 tons of ore per day. They have a large part of the material for the mill already on the ground. Some 30 men are at work, and inside of six weeks the gold bullion will be making itself felt in your city. They have already on the dumps about 100 tons of ore that is said to assay over \$200 a ton in free-milling gold rock. There are a large number of small ledges in this district, and I believe it is the intention of Hall & Banta to buy up all ores, consequently it will be a large field for chlorides to make a harvest. Two Mexicans in three weeks' arastrating are said to have cleaned up over \$500 on the Wilbur mine. There are, however, a number of ledges ranging from one to three feet in width, that will yield large quantities of good ore on further development. The mineral-bearing ledges extend over an area of about nine miles in length and four or five in width. Water is plentiful anywhere around the mountain in the dry lakes at a depth of 16 to 20 feet, and of good quality. Victor, on the California Southern, is the shipping station for this district, and the camp is about 45 miles distant, having two good watering-places on the road, Rabbit and Old Woman springs.

Santa Barbara.

QUICKSILVER.—A party which has returned from the Santa Ynez mountains reports that the quicksilver mines of Los Prietos y Najalayeyua, 15 miles by trail over the mountains, will close down shortly, after many years' run. Out of 130 tons of cinnabar mined, the yield was only seven flasks of quicksilver. The mine is owned by a S. F. company, but is worked by Spanish lessees, who claim they have lost \$25,000.

Shasta.

SQUAW CREEK.—Shasta Democrat, May 28: Carson & Snyder have rented the Croesus quartz-mill on Squaw creek, and have a force of men at work in their mine, the Snyder, on which they have driven a tunnel over 400 feet. They have a pay chute 265 feet, with an average of 150 feet backs. They have cut out a station and will put down a winze, and also make an upraise. They will commence crushing rock to-morrow.

Sierra.

MILL.—Mountain Messenger, May 28: Theo. Smith intends to put up a 10-stamp mill at his quartz ledge, near Alleghany, the machinery to be furnished by the foundry of Geo. G. Allen, Nevada City.

A RICH STRIKE.—Sierra Tribune, May 27: The owners of the San Louis mine are in high spirits. Last Saturday one of the workmen came down from there with the news that exceedingly rich ore had been encountered in the lower tunnel. As a proof of the strike he brought with him a sack of quartz, which is of as fine a quality as we have seen for many a day. The ore is literally covered with gold, and contains sulphurets of high value. The San Louis is in Avalanche ravine, and was first discovered by Mexicans in early days, who worked it with profit to as great a depth as possible with the means then at hand. It was then abandoned, and remained idle until it was relocated, and operations

begun thereon by the present Sierra City company. They have expended about \$5000 in running tunnels. The rich strike made last week was in the lower tunnel, and is 200 feet in depth on the vein. The ledge is three feet wide and runs east and west. The owners will proceed to run ahead on the vein, and it is more than likely will conclude to erect a mill there this season. This is an important strike for our district.

THE MARGUERITE MINE SOLD.—The Marguerite mine and all personal property attached thereto was sold by the sheriff last Saturday to satisfy a judgment of \$105,000 obtained against it some time ago by Royal E. Robbins, of Boston. Mr. Robbins' agent was on hand with instructions to buy everything in. The mine was knocked down to him for \$46,000, while he "scooped" the personal property in for \$3700. As soon as the mine passes into the hands of Mr. Robbins he will, in all probability, start it up, at least his agent so hinted while here.

FROM DOWNIEVILLE.—Sierra Tribune, May 28: At the Wide Awake drift mine, which is situated at Alabama Hill, good pay gravel has recently been encountered. Fred Bosch and Wm. Hanson were the only men working there, but the company now proposes putting on several additional hands. The tunnel is in about 500 feet. Different parties have been engaged in prospecting this claim for a period of 15 years past, but heretofore there has always been a failure in discovering pay. Carry the good news all along the line that after running 1700 ft. of tunnel at the Gold Bluff, A. VanSlyke, the owner, on Wednesday had the satisfaction of gazing upon the long-sought-for ledge. The vein is one and a half feet in width and shows considerable free gold. The strike has occasioned much excitement here and on every corner knots of men are gathered discussing the affair. Mr. VanSlyke has carried on this work single-handed, and although at times things looked very dark he never for a moment has yielded or despaired, but has continued right along devoting his money and energies to the purpose of pushing the tunnel ahead to the ledge.

Trinity.

KNOW-NOTHING CREEK MINES.—Trinity Journal, May 29: Mr. D. Hansen returned this week from the mines on Know-Nothing creek in which he is interested, and reports the following: The company has eight men at work, and everything looks favorable. The ledge in the Hansen mine runs from a trace or seam to two feet and averages well. They are down about 70 feet. The last crushing went 550 to the ton. They are also stopping out ore from the Sugar Pine ledge, which, so far as they have gone, looks very flattering. They have heretofore packed all their ore from the dump to the astrata, but they have now about completed arrangements by which they will sled the ore.

NEW RIVER.—Work is going on at the Mountain Boomer, Arago, Tough Nut, Golden Eagle, Ridgeway, Uncle Sam, Sherwood, and Grover Cleveland mines. The Hard Tack will start up soon, also the Carrie and Mountain Belle. At the Hard Tack arastra they are crushing some ore from the Hunter and Hoo Chi Noo mines. Dean and Toms are crushing ore from the Ridgeway. The Uncle Sam mill will start up this week on ore from the Uncle Sam mine. Mr. Heley will start his mill up on St. Elmo ore soon. The Tough Nut Co. is building a wagon road to the Hard Tack arastra, intending to have their ore crushed there as soon as the road is completed. The Carrie Mining Co. is talking of putting in a three-stamp mill and rock-breaker, to be run by water-power, and is making surveys and estimates. Mr. Thos. Knight, of Arcata, one of the owners in the Arago mine, is well pleased with his prospects. The warm weather is taking the snow off from the high mountains, and prospectors are commencing to move around.

BULLYCHOO.—Trinity Journal, May 27: Mr. D. L. Smith, of Bullychoop, states that the mining interests of that section are daily increasing in importance. The recent discovery on the Mammoth is the most important yet chronicled in the history of the camp. A shaft has been sunk on the new ledge to a depth of about 20 feet, at the bottom of which the vein is seven feet wide and averages \$20 a ton. A tunnel has also been run, and the ledge tapped at a depth of 200 feet; this insures permanency and makes the property of great value. A ro-stamp mill is now in operation on the mine, and its capacity will be increased by 10 additional stamps as soon as lumber can be procured. In the Jerusalem mine, the Moon Bros. recently found a new vein which prospects well, but is not yet sufficiently developed to show its actual value.

Ventura.

OIL DEVELOPMENT.—Republican, May 28: Despite the views ascribed to a noted expert that the petroleum interests did not amount to very much, the development of the oil product by the Standard and other companies having large interests in the oil fields of Ventura county goes steadily forward. On last Wednesday the Sespe Oil Co., an organization composed largely of Los Angeles capitalists, started the pumps in its wells on Tar creek, 20 miles northeast of Santa Paula, and began the first run of oil, filling the 32,000-barrel tank at the latter point. When the oil reached a point about half-way to Santa Paula the pipes burst and the pumps were stopped as soon as word could be sent to the wells, although a great quantity of oil was lost by the operation. The pipe was repaired and the pumps were again started, the oil reaching Santa Paula early Friday morning. It required 200 barrels of oil to fill the two-inch pipe for the distance of 20 miles. The oil from Tar creek is light brown in color, and runs rather freely. On Friday the first run of oil was also made from Adams canyon, eight miles northwest of Santa Paula. The oil is darker, thicker and heavier than that from Tar creek and runs very slowly.

NEVADA.

Washoe District.

CON. CALIFORNIA AND VIRGINIA.—Enterprise, May 28: On the 1200 level the south drift, entering from the Ophir mine, was extended 30 feet; total length in Con. California and Virginia ground, 180 feet. On the 1400 level west crosscut No. 1 from the south drift was extended 40 feet; total length, 174 feet. The usual quantity and quality of ore is being extracted from the new south stopes on this

level. The operation of injecting carbonic acid gas into the bulkheaded portion of the mine, for the extinguishment of the fire smoldering in the old timbers, is still steadily continued, and will be kept up until this gas is found to have risen above the fire. The usual quantity and quality of ore has been shipped during the week to the Morgan and Eureka mills, on the Carson river. The battery samples are showing about the same as last week. Since last report bullion to the value of \$79,751.92 has been shipped to San Francisco.

SAVAGE.—The winze below the 600 level has been sunk and timbered 12 feet, and are now engaged in putting in a station set at this point to open the 700 level. West crosscut No. 6 on this level (the 600) has been extended 18 feet and the south drift therefrom 19 feet, all the way in quartz. The east crosscut from the fifth floor above this level (600) has been advanced 45 feet. The crosscut west from the eighth floor was extended 25 feet. On the 800 level No. 1 east crosscut from the main lateral drift was advanced 22 feet. The upraise from this level in the quartz body has been extended 18 feet, and is now up 74 feet above the track floor of the level.

CHOLLAR.—Good headway is making in the drifts east and west on the 450 level, by means of which the Sharon shaft at the croppings and the old Chollar shaft will be connected. A number of prospecting drifts and crosscuts are being run to explore the ground on the various levels from the 100 down to the 1300 level. Some bodies of good milling ore are being opened up that promise to prove extensive. The ore extracted in making these explorations is stowed away in drifts and other openings on the levels where it is found. They have a fine deposit of ore on their 1300 level that is known to be eight feet in width; also, in other places are reserves of ore that can be extracted whenever it can be mined.

HAYWOOD.—The mine is looking well in every part, and an almost unlimited amount of ore might be extracted from the bodies now opened up could facilities for milling be obtained. On the 200 level they have a body of ore that is known to be over 30 feet in width. The greatest depth to which they have yet sunk on the vein is 200 feet, and all is ore from that point up to the grass roots. The Thompson mill is running steadily on ore from the mine.

GOULD AND CURRY.—On the 300 level the main west crosscut was extended 20 feet; total length, 113 feet. The north drift started last week from the main west crosscut, 140 feet west of the upraise, still continues to show well in quartz of a promising character. From the upraise in the old stopes, 50 feet above the 300 level, are drifting in various directions and finding some ore.

CROWN POINT.—Are extracting about 1600 tons of ore a week, and the ore-producing sections are still presenting a favorable appearance. Much prospecting is being done in all parts of the mine, and some new and very favorable deposits of ore are being opened up. The 450 and 550 levels are being opened to explore the downward extension of the ore body exposed on the 350 level.

MEXICAN AND UNION CON.—On the 1300 level the joint Union and Mexican drift running north-easterly was extended 23 feet. This drift is now 583 feet in Mexican ground. The joint Mexican and Ophir east crosscut was extended 20 feet; total length, 475 feet. It continues in material composed principally of the vein porphyry usually encountered in this portion of the Comstock lode.

BALTIMORE.—On the 300 level the ore is increasing in quantity and improving in quality. A raise is being made in the vein above this level from which a considerable amount of ore is being obtained. The vein at this point is 50 feet in width. On the 400 level good milling ore is being extracted, and a crosscut is being run to get on the west side of the vein. Good milling ore is being found in the crosscut.

HALE AND NORCROSS.—On the fifth station level the north drift was advanced 38 feet, and the main south drift 26 feet. This south drift is showing some good ore. East crosscut No. 1 from the main south drift was advanced 30 feet. A portion of the Norcross force is still engaged in removing the rock from the Chollar incline, and in repairing the connecting drift on the 1300 level.

OST.—The mine continues to look well and is yielding a large amount of gold-bearing quartz of good quality. The explorations below the tunnel level have resulted in the development of a large deposit of ore that is of a better quality than was found above. The new patent whim is found to work well and gives satisfaction in every respect.

YELLOW JACKET.—Less than the usual daily yield of 200 tons has been extracted this week, owing to the temporary laying off of a considerable number of miners pending repairs to mills. The upper portions of the mine are being thoroughly explored, and some deposits of ore that will pay for milling are being opened up.

OCCIDENTAL.—In the upper tunnel on the 48 level the south drift from the north incline winze was extended 10 feet; total length, 240 feet. In No. 3 east crosscut the incline winze was sunk 10 feet; total depth on the slope, 95 feet. During the week 21 tons of ore were extracted from the winze and the south drift.

BEST AND BELCHER.—On the 1500 level east crosscut No. 1 is stopped. No. 2 was advanced 60 feet; total length, 845 feet. This crosscut is passing through vein material which shows some small stringers of quartz.

JUSTICE.—A large amount of ore has been opened up ready for extraction on the 400 level and at points above, and about 500 tons of good ore lies on the dump awaiting milling facilities.

UTAH.—On the 472 level the north drift from the main west drift was extended 40 feet; total length, 745 feet. The face still continues in vein porphyry, passing through clay slips.

BULLION.—The north drift on the 200 level is making good headway, and has been turned somewhat to the northwest. It is in vein material that yields low assays.

ALTA.—The west drift on the 825 level has reached the vein, and explorations are being made along the east wall.

KENTUCK.—About 50 tons of ore a day is being extracted. It comes from above the 1300 level. This ore is being worked at the Douglas mill, Lower Gold Hill.

OPHIR.—On the 1300 level, north winze No. 1

has been making good progress in low-grade ore, leaving the old stope timbers above on the east.

ANDES.—The winze on the 240 level is down about 20 feet, and is still showing some ore. The upraise from this level (near the winze) is also in ore of a fair quality.

Jackrabbit District.

THE ONONDAGA.—Pioche Record, May 24: The mine is low down in a small gulch at Royal City, and 1200 feet easterly from the Day mine. We found the dump and ore-house crowded with ore, several tons of which were sacked and ready for shipment. The history of the discovery of the mine is a brief one and can be given in a few words. A streak of lead, perhaps an inch or two thick, wedged rather tightly in a limestone crevice, was for years exposed to the elements, to the eyes of various prospectors, and also every one else who would take the trouble to give it a glance as they passed over in search of some more promising prospect. Eventually a prospector fooled with it a little, then he put in a few shots, and to his surprise the ore streak became thicker and of a much better quality as his work advanced. Then several men were put to work running a tunnel mostly on ore, the streak varying in thickness from one to three feet. This ore was fair in silver and very heavy in lead, was shipped to Salt Lake for reduction, and it netted its owners a fair profit. The tunnel was driven on the vein a distance of 60 feet, the vein averaging better in both quantity and quality as every foot was gained. A winze was then sunk from the tunnel level to the depth of 78 feet with a continuous ore body going down and developing the fact that the Onondaga was a contact vein with a porphyry foot and black lime hanging. Their upper workings had been merely in a fissure of the limestone cap, which, however, pointed to the true formation below. At the date of our visit an upraise was being driven to the surface, a distance of about 20 feet from the tunnel level, for the purpose of getting a good current of air through the mine. The upraise is in solid ore from which, in one week's work, four men broke down 20 tons.

ARIZONA.

MINES AT CHLORIDE.—Cor. Mohave Miner, May 28: At Chloride in every hole that we come to you will see a couple of men taking out ore and developing their mines. At that camp McCall and Hanson have started to work on the Nigger Baby mine with a fine prospect before them. At the Juno, owned by L. A. Sanderson, of S. F., leased to Thompson, Sample & Shrope, they have leaching works in full blast. They are now taking out some very fine ore and will soon ship a carload of 300 to 500-ounce ore. La Brosse & Co. have leased a portion of the Distaff mine from Chas. E. Sherman. This mine is famous for its rich ores, and La Brosse has struck one of the rich pockets. D. W. Grant is taking out rich ore from the Little Wonder mine. It takes him two or three months to get out a ton of ore, but when he gets it he has about \$700 or \$800. W. Brakeman has been shipping ore regularly from the Schenectady, and has been doing pretty well. Delhanty & Bissett are taking out some fine ore from the Justice. They have out now about five tons of 100-ounce ore. Then we leave Chloride and get to the Altata mine, owned by J. J. Goshorn. Here W. H. Kelly and Dan McKennon are working with Goshorn on a lease, and have out nearly two carloads of ore. They have to ship their ore to the Argo works, Denver, Col., as there is considerable copper in the ore, and the other smelters do not seem to want it, but so far, it has been the best paying mine in that section of the district. The new bonanza, the Minnesota mine, owned by John Barry, and leased to Hussy, Campbell & Madden, beats anything, so far, north of the Mineral Park. They can take out from two to three carloads a month of 150-ounce ore, with nothing to do but to stope it down and ship it.

MORENCI MATTERS.—Cor. Clifton Clarion, May 28: Notwithstanding the depreciation in copper, the production of the Detroit Copper Co. continues undiminished. It is true that the wages of the mine laborers are not quite as high as might be desired, but there is consolation in the fact that no reduction is contemplated. The principal mines worked at present by the Detroit company are the Copper Mountain, Yankee, Montezuma, Ryerson, and Arizona Central, the output of which, both in quality and quantity, continues as satisfactory as heretofore. Work at the smelters is running smoothly. One smelter is not sufficient to work off all the ore taken out, a second is therefore blown in a portion of the time. The production is about 400,000 pounds per month or 13,000 pounds per day.

TOMBSTONE.—Democrat, May 29: The Grand Dipper shaft is down 235 feet. Dripping has been discontinued at the first level, and no levels or cuts will be started until the shaft reaches a depth where connections can be made with the 300-level of the Grand Central. The Emerald will make its average shipment of about 500 tons of ore this month. The Silver Thread will, with one shift of a few men, ship about 75 tons of ore for May, averaging from 80 to 90 ounces per ton. The Maine's shipment for this month will be about 25 tons. The ore is of a high grade. At the Chance shaft is being sunk as rapidly as possible. The ore on the 75 level continues good. The shaft at the Jonathan has been straightened up and a small hoist will be erected without delay. Some little work is being done near the north line of the contact. No large deposit of ore has yet been found, but the ledge yields a fair quantity of average grade. The pump has arrived at the West Side. The chloriders at the Luck Sure, Ingersoll, and Mamie, are doing well. The usual work of development continues at the Rattlesnake. The drifts and stopes are looking well, and the ore taken from them to fill contracts is barely missed.

IDAHO.

CLEANUP.—Idaho World, May 27: Wm. Kearney and Thos. Barry, Jr., made a good cleanup last week in their claim on Yankee Bar, between Pine and Bannock creeks. This section was worked in early days down to what was supposed to be bedrock. Kearney & Barry conceived the idea that, as the ground that was worked was shallow, this was not the true bedrock, and proceeded to demonstrate their theory by sinking, and were soon through this strata and into good gravel. They proceeded to fit

up for hydraulicizing, and this spring have made a short but very successful run. Alex. Kyle is down from Elkhorn. He says this mine still makes an encouraging showing. Work in the lower level has been checked somewhat the past few weeks by a copious flow of water. About 100 tons of good ore have been taken out in the lower level. Alexander Kyle has been at work on his location near the Elkhorn, developing and prospecting. Jas. McMahon is digging a ditch to carry water on a location he made several months ago on a ledge two or three miles east of Elkhorn, on the east fork of Elk creek. More work is being carried on this spring on this side of the Basin, than last season, and the run this year will be unusually long, there still being a good depth of snow in the mountains. The present promises to be a good year all around, as additional activity is witnessed in quartz-mining and prospecting.

HUNTER.—Pioneer Press, May 28: Dennis Ryan, talking yesterday of his new mine in the Cœur d'Alene country—the Hunter—says that it is the richest in that range, but that operations on it have not commenced yet. The tunnel is 370 feet long already.

THE GUNN GROUP.—Wood River Times, May 27: The group consists of five mines. All show a defined vein carrying ore, but the developments have been mainly confined to the Jumbo, which is the central claim of the group, and upon which the mill is situated. The ledge shows up boldly all along the 1500 feet covered by the Jumbo location, and is exposed by numerous cuts, tunnels, shafts, or "prospect-holes." In one place the ledge is opened like a quarry, and four men can blast and extract 20 tons per day. The deepest workings are in the main tunnel, which is run so as to tap the vein at a depth of 200 feet. In these workings the vein shows to better advantage than anywhere else, as the ore assays from \$30 to \$150 per ton, and there is a compact body of it from five to eight feet wide. The Free vanners seem to be just what was needed at the mill to enable Capt. Gunn to get the full benefit of his ore. A few weeks ago he had Rouse concentrators, which had been placed with him on trial. They proved a total failure, as they utterly failed to save the sulphurets. The Free vanner started yesterday does this, however, the amount of loss not exceeding 10 per cent, and it is safe to say that from this time on, Capt. Gunn will realize fully \$200 upon every ton of ore run through his mill. The mill is of 10 stamps, and has a daily capacity of 20 tons. The Gunn group is owned by Capt. Gunn and Robert Rowland, of Camp creek, and Messrs. Wolcott & Mann, of Pocatello.

AT THE SMELTERS.—Ketchum Keystone, May 28: A new roaster is to be built and a smokestack 75 feet in height, capable of carrying off the smoke of six roasters, of the design of the one now to be built, will be erected. A carload of ore from the Idaho Democrat mine, near Hailey, was received during the week, coming through the Hailey sampling-mill. The mine is the property of Q. A. French. The erection of the new storage building will be commenced on the completion of the work now in progress on the water ditch of the company. The hauling of lime has been commenced by contractor Frank Gooding. The charcoal kilns have been charged and are ready for burning. Three carloads of fire-brick were received at the smelting works on Wednesday. A carload of ore from Flint district was received at the smelter on Thursday.

THE GOLD BELT MILLS.—Wood River Times, May 29: The Camas No. 2 mill is not showing very good results, as it has only two vanners for its 20 stamps. They, however, make a ton of concentrates per day, which assay from \$40 to \$350 per ton—besides what free gold is saved on the plates. Capt. Gunn's mill is running steadily and smoothly, but is still crushing the surface or low-grade ore. The two Free vanners make about one ton of concentrates per day, worth about \$100. Here, too, there is lack of tonnage in the vanners, as the two at work only take the slimes from about four out of the ten stamps of the mill. Three-fifths of the slimes, therefore, flow down the creek and are lost.

MONTANA.

ELKHORN DISTRICT.—Cor. Helena Independent, May 28: Elkhorn is in Jefferson county, 40 miles southeast from Helena. There is a fair chance of a mining boom this coming summer, in the camp. All the mines, with one or two exceptions, are showing up in fine style. In the Holter, owned by the Elkhorn Co., a rich streak of ore, averaging from 400 to 500 ounces, has been struck between the 650 and 750-foot levels. This mine has never looked so well before. During the past week a quantity of the tailings from the old fire-mill have been run through the roaster and pans. Much of these tailings run as high as \$100 per ton. In the C. and D. mine, owned by E. W. Toole, A. G. Clarke, Chas. A. Clarke, and R. T. Woolston, which is about one mile farther up the gulch above the Holter mine, it is estimated that there are 150,000 tons in sight, averaging about \$40 per ton; a great quantity of this ore is concentrating ore, which goes 13 ounces silver, \$16 gold and 15 per cent lead, and the probability is that a concentrator will be built this year to treat this ore. The 100-foot level has been extended 150 feet and shows up a body of ore 32 feet wide between the walls, the chief beauty of which is that it is all pay ore. The shaft is down 150 feet, and it is to be sunk still farther. There are over 1000 tons of ore on the dump. There is one stack smelter in connection with the mine, situated about two miles down the gulch. The present treating capacity is 30 tons per day, but another stack is in course of erection, which will increase the capacity to 60 tons. The Elkhorn Queen, a comparative recent discovery, is undoubtedly a very fine prospect. The ore averages 20 per cent lead, and carries a fair quantity of silver, from 30 to 300 ounces per ton. There are numerous rumors afloat about other rich discoveries, but many of the prospectors don't know the difference between crystallized limestone and crystallized lead, and their assays don't always pan out up to their expectations. Dr. Hogan, a young M. D., recently from Albany, N. Y., and Chas. F. Boyle, have leased the large body of mill-tailings which were corralled by Hollinbeck & Jamieson some five years ago, about half a mile below the mill, and are working them over with great success by means of a combination of the various Cornish processes, their concentrates running over 100 ounces per ton. There will soon be a

diamond drill in camp, which will be used for prospecting purposes. This will be a great advantage to investors in stock schemes, as for almost a nominal sum they can find out whether they are about to invest in a wild-cat or not. The promoter of the scheme is Chas. F. Boyle, of Helena.

NOTES.—Butte Miner, May 28: The Amy & Silversmith mine is working a force of 40 men developing on the 400 and 500 levels. The Champion is daily shipping its regular amount of ore to the Butte Reduction Works. The little hoist works to perfection. The Old Lexington is crushing 30 tons of ore a day of 24 hours. The Silver Bow mill gets away with only seven tons more. Miners will be put to work on Sunday in the Hope mine stoping. The shaft was sunk 20 feet the last week and favorable progress is being made. The new boilers at the Bluebird mill have been placed in position, and will be ready to steam up on the completion of the work on the stamps now being added. The chutes where the Bluebird cars are loaded for the mill could be greatly improved on, as at present they are very inconvenient when the brakeman starts his train. The crosscut on the 300 level at the Orphan Girl shows very good indications. The ledge has been penetrated five feet, and prospecting and developing are in active progress. Sufficient ore is being produced from the large ore body of the Josephine, just east of the Lexington, to keep the 11 stamps of the Old Lexington as well as those of the Margaret Ann mills continually dropping. Messrs. Murphy & Thompson, mineralogists of the Butte Reduction Works, have sampled some copper ore taken from different mines in Park canyon, and report that though some of the specimens are very fine, it is not present in sufficient quantities to pay for working. They intend making an extensive trip to out-of-the-way gulches and canyons, prospecting.

MISSSED THE SALE.—Inter-Mountain, May 29: Mr. R. B. Wallace returned to Butte last evening after a week's trip to Helena, Marysville and Bald Butte. The object of his visit was to make a mill test of the Sterling mines at Bald Butte. Some English capitalists had secured a bond on the mine, and the sale would have been made undoubtedly if it had not been for the passage of the alien law. Since that it has not been known exactly what would become of the deal, but the English parties desired Mr. Wallace to go over and make a mill test, which he has just done. Mr. Wallace took a look at the Drumlunnon, where 20 stamps are continually dropping. He says the mill comes the nearest to perfection of anything he has ever seen. The Gloster and Empire are running full, and the whole country over there is prosperous. Mr. Wallace thinks that the alien law will prove somewhat of a drawback to mining operations this year, and is of the opinion that a number of sales have been hindered by it.

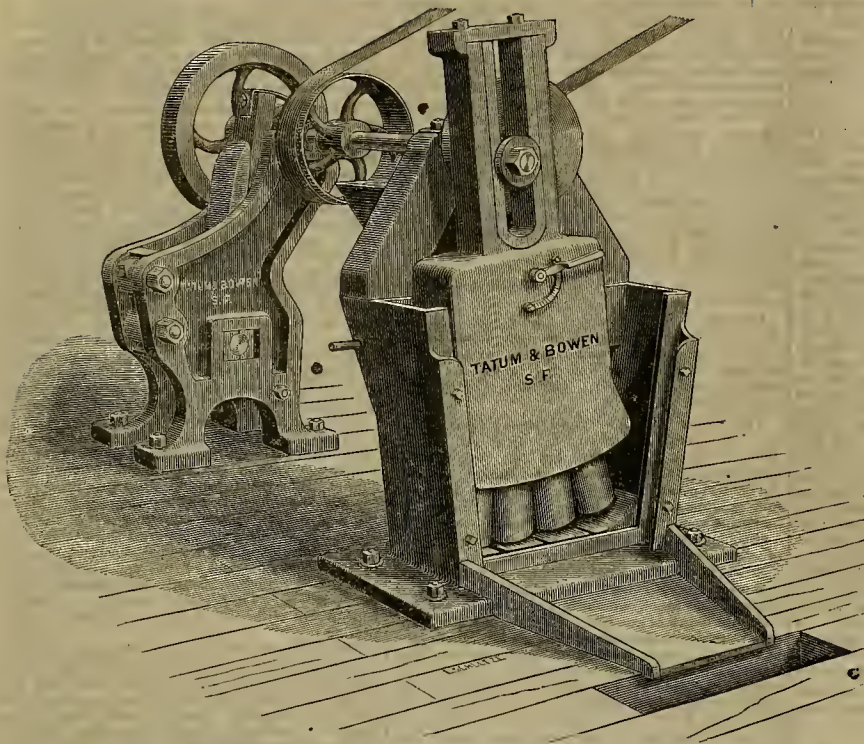
NEW MEXICO.

SOCORRO NOTES.—Bullion, May 28: The ore receipts from the Magdalena district to this city are increasing steadily. Another and distinct ore body has been uncovered in the Three Lilies of Water Canyon. Work was resumed on the Anchor last week and is now progressing in a satisfactory manner. The Graphic is improving steadily and is shipping continuously to the Graphic smelter. The Black Hawk, Cowles and Mullen is showing up three feet in its 75-foot tunnel. The ore consists of lead carbonates bearing silver. The carment of ore from the Embolite mine at Hermosa, just treated at the Billing smelter, returned 145 ounces silver and four per cent lead to the ton. The Juanita is shipping to Socorro as usual. The shifts are to be reinforced immediately, as that property is showing up increased ore. Mr. R. M. White, superintendent of the Palomas Chief mine, gives us the figures of the returns from the carloads of ore recently treated at the Billing smelter: Dry weight of ore, pounds, 27,975; silver, ounces, 220; lead, per cent, 8.80. Messrs. G. L. Brooks and Charles Blanchard went out to Hansonburg. The latter gentleman says that the Compromise dump is a revelation of the treasures of that camp. The ore body and its silver value have increased steadily from the first day that Mr. F. Wilson commenced opening up the property.

FROM KELLY.—Cor. Socorro Bullion, May 28: Ed. Henson came up Saturday to begin work on the Tip Top, on which he will drive a 100-foot tunnel. Terry Mullen is putting in every hour on his property, and in a few weeks it and the Yellow Rose will be producing and paying properties. A large contract has been let on the Greyhound mine, also one on the Fashion mine.

OREGON.

GOLD HILL.—Rogue River Courier, May 29: The quartz mines of the Gold Hill Mining and Milling Company are a mile south of Gold Hill. They consist of three well-defined ledges, all of which have been sufficiently prospected by shafts and cuts to leave no doubt as to their extent and uniform paying qualities. On the North and South ledge three shafts have been sunk, and one drift 160 feet long has been run. In all the shafts rich rock was found. From the North and South we went to the 10-stamp mill, which we found in full blast. The mills are about half a mile from the East and West ledge, upon which they are now working. Two four-horse teams haul 36 tons of ore a day to the mill, which is worked through in 24 hours, and which yields \$5 per ton, the milling expenses being about \$4 per ton, as wood is convenient and cheap. We found the teamsters unloading what at first sight we called red dirt, and which was the so-called ore which was paying from \$100 to \$150 per day over and above running expenses. The Dardenlades ledge runs east and west, and was discovered by the blowing over of a tree which exposed the ledge to view, upon the dump of which we saw much red rock, the gold particles being plainly seen by the naked eye. From here we go to the East and West, where there are mountains of the above described carbonate ore. This mine is full of quartz seams and detached pieces of rich quartz which bears a large per cent of galena. We saw a 19-hour run on unselected ore clean up \$160. The bullion contains about \$15 per ton in silver. It is not found necessary to use the rock-breaker nor the concentrator upon the ores being milled. The Rogue river, which flows through Gold Hill, affords a magnificent water-power which, if utilized, would render the expense of milling these ores still less.



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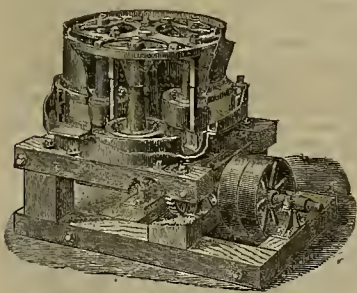
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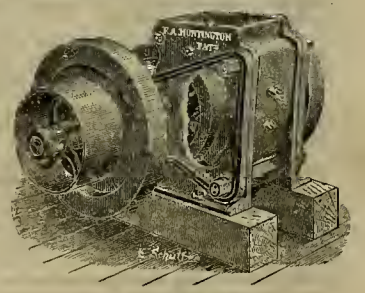
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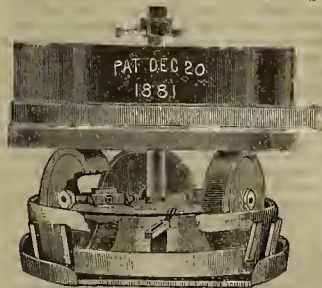
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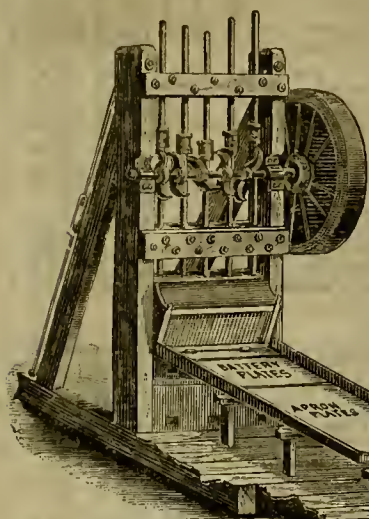
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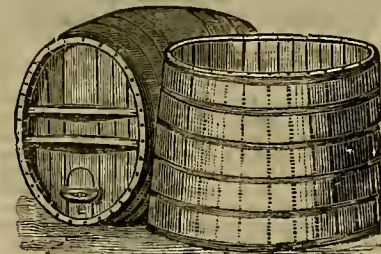
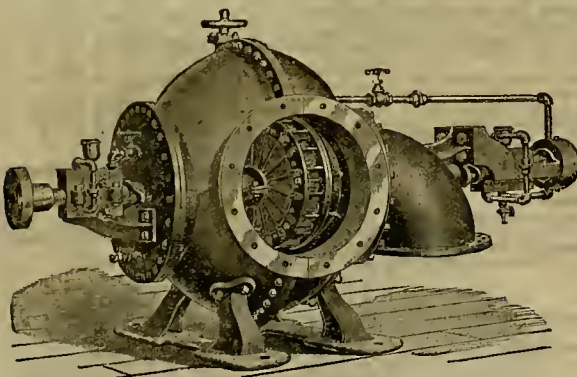
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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING MAY 24, 1887.

- 363,573.—PRESSER FOOT AND GUIDE.—J. F. Atterton, Portland, Ogn.
- 363,560.—VELOCIPED—E. Blossfeld, S. F.
- 363,365.—BALING PRESS—T. J. Corning, San Jose, Cal.
- 363,375.—WHIRLIGIG—J. Dupuy, S. F.
- 363,394.—SAFETY GUARD, ETC., FOR CABLE RAILROAD—W. Ireland, Sr., S. F.
- 363,467.—CIGAR BOX—D. H. Jaccard, S. F.
- 363,475.—LATHE ATTACHMENT—McCrosson & Hendry, S. F.
- 363,476.—LIFTING MACHINE—D. E. McKee, Potter Valley, Cal.
- 363,479.—HOSE REEL—Jos. Perkins, S. F.
- 363,686.—WHEEL CULTIVATOR—P. Scharbach, Silverton, Ogn.
- 363,489.—MUSIC LEAF TURNER—W. E. Swett, S. F.
- 363,562.—ELECTROLYTE—A. C. Tichenor, S. F.
- 363,491.—COMBINED BEVEL SQUARE, ETC.—E. F. Van Amringe, Oaklnd, Cal.
- 363,703.—FIRE-KINDLER—C. Van Gulpen, S. F.
- NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect accuracy, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MUSIC LEAF TURNER.—Wm. E. Swett, S. F. No. 363,489. Dated May 24, 1887. This music leaf turner consists in a combination of devices so as to provide a simple and effective implement for turning the leaves of printed music.

COMBINED TOOL.—R. F. Van Amringe, Oakland. No. 363,491. Dated May 24, 1887. This invention relates to the class of carpenters' combined tools, and especially certain improvements in and additions to that certain carpenters' level which is secured by patent to the same inventor. The invention consists in a combined level-square, beam-compass, level and gauge.

COMBINED BALING PRESS AND FEEDER.—L. G. Thompson and A. H. Isham, S. F., assignors to Truman, Isham & Hooker. No. 363,095. Dated May 17, 1887. This improvement in baling presses consists in a novel means for lifting the hay or material to be baled in regular or irregular quantities into the press, and partially compressing it before delivering it to the press; an improved mechanism for pressing the same in successive charges, and a means for loosening and discharging the bale after it has been finished.

LIFTING JACK.—A. K. Bagwell, Plainsburg, Merced Co. No. 363,194. Dated May 17, 1887. This carriage and lifting jack consists of a standard having guides in a vertical line at its upper end, in a movable lifting and bearing piece traveling in these guides, having offsets to support the load, and a curved lever fulcrumed in the standard, and having an anti-friction roller at the inner end which travels in a curved opening formed in the movable lifting piece, so as to raise and lock it when desired.

ELECTROLYTE.—A. C. Tichenor, S. F. No. 363,562. Dated May 24, 1887. This invention relates to an improved electrolyte, to be used in galvanic batteries for the production of an electric current therein. It consists of a solution in water of a certain earth which is found in various parts of California. The patent covers a galvanic cell or cells having electrodes, consisting of different metals in contact with an electrolyte or exciting fluid, composed of an earth whose component parts are silica, peroxide of iron, lime, alumina, magnesia, sulphuric acid and water, in certain proportions mixed with or dissolved in water.

HOSE REEL.—Joseph Perkins, S. F. No. 363,479. Dated May 24, 1887. This invention relates to certain improvement in reels for winding hose and in a means for supporting and driving the same. The object of the improvement is to mount the reel upon the truck which supports it so that when the truck is in position to be wheeled from place to place, the hearing-wheels of the truck serve to support the rims of the hose-reel, and cause it to rotate without the use of intermediate bearing of any kind, the rotation being at the same rate as that of the advance of this truck, whether the wheels of the latter be large or small.

LATHE ATTACHMENT.—J. T. McCrosson and Wm. Hendry, S. F. No. 363,475. Dated May 24, 1887. This invention relates to an attachment for turning lathes which is especially applicable for turning the tapering spindles of vehicle axles. It consists of a hollow or tubular sleeve extending outwardly from the face-plate or spindle of the lathe to which it is attached, and to a chuck supported at the outer end of the sleeve for holding the square portion of the axle and centering it by means of uni-

versal jaws while the outer end on the spindle is held by the tail-stop center of the lathe. In connection with this is an adjustable guide, which is connected with a tool rest so as to produce the desired taper to the spindle.

SAFETY SIGHT FEED REFLECTOR.—W. S. Getchell, Oakland. No. 363,060. Dated May 17, 1887. This invention relates to improvements in those devices which have what are known as "sight glasses," for the purpose of watching their operation; and the invention consists, in connection with the sight glass, of a guard or shield between the observer and the glass, and a reflecting surface or mirror on the other side of the glass, whereby, though said glass is concealed from direct vision, its operation may be as readily observed in the reflecting surface. The invention further consists in the particular and novel arrangement and combination of the said guard and mirror and their relation to the sight glass. The object of the invention is to protect the observer from injury due to the bursting of the sight glass.

LIFTING MACHINE.—David McKee, Potter Valley, Mendocino county, assignor one-half to H. P. McGee. No. 363,476. Dated May 24, 1887. This invention relates to that class of lifting machines in which the framework is a derrick-like structure, and the invention consists in a fixed mast, a boom hinged thereto, and adapted to move through an arc in a vertical plane, said boom being jointed, so that it can also move through an arc in a horizontal plane, a block and tackle and a winch for operating said boom, an adjustable extension for the boom, peculiarly operating and constructed, a lifting finger upon the end of the boom for its extension, and details of construction relating to the several adjustments and operations of the machine. The object of the invention is to provide a simple and effective machine for raising weights of any description, either merchandise, sacks of grain, hay or anything else required to be elevated, said machine being of a character easily transported and readily set up in a desired position.

Mining Share Market.

Those interested in the stock market seem to be expecting a much better market than they now have. The *Enterprise* says there are some rumors of improvements in the Consolidated California and Virginia at one or two points, but nothing has been officially made known of any new ore strike in that mine.

The grading for the new water-mill below the Chollar shaft is about completed. All will be finished as regards grading in another day or two. Already the stone masons have commenced operations and are engaged in laying up a wall on the south side of the excavated site. This wall is three feet in thickness and is being constructed of the finest of porphyry rock. Mr. Nolan, the contractor for this part of the work, has a strong force of stone masons on the ground, also has many men employed in his quarry.

Many carpenters are at work at framing and preparing timbers for the mill building. The battery-blocks have already been completed, and yesterday they were at work upon the heavy timbers that will be used in the construction of the battery-frames.

Many men are now employed about the California stamp-mill, which is to be run by water-power, as also will the pan-mill that is to be operated in conjunction with it. Both mills will be driven by power transmitted from the C. and C. shaft, in which will be placed the big Pelton water-wheels, referred to in another column. The power will be transmitted by means of steel-wire cables or belts.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court Department No. 1, San Francisco:

TEALS MARSH BORAX CO. May 31. Capital stock, \$1,000,000. Directors, F. M. Smith, Warren Olney, J. W. Mather, Alton H. Clough, and J. H. Maynard.

PIONEER LAND CO. May 31. Capital stock, \$3,000,000. Directors, S. T. Alexander, W. H. Chickering, P. N. Lilienthal, W. Thomas, and Leon Sloss.

SONOMA LAND AND IMPROVEMENT CO. May 31. Capital stock, \$750,000. Directors, A. S. Rhorer, N. W. Griswold, M. Rhorer, A. G. Pratt, and C. W. Crocker.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Alice, May 28, \$34,428; Moulton, 28, \$12,528; First National, 28, \$50,241; Bluebird, 28, \$15,068; Alice, 29, \$33,712; Hanauer, 25, \$45,000; Alice, 25, \$14,269; Bannock, 20, \$11,000; Hanauer, 24, \$71,700; Con. California and Virginia, 31, \$71,235; total for May account to date, \$223,968. The first shipment of bullion from the Sprucemont (Elko county) furnaces was made last week. There were 700 bars, weighing 35 tons, value not stated.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

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COMPANY.		LOCATIONS. NO.		AMT. LEVIED.		DELINQ'T. SALE.		SECRETARY.		PLACE OF BUSINESS.	
Central California	Ill Co.	California.	4.	1.00.	Apr 27.	June 6.	June 22.	J. G. Hulse.	314	California St.	314 California St.
Crocker M Co.	California.	Arizoon.	4.	16.	May 18.	June 23.	July 13.	A. Water.	308	Montgomery St.	308 Montgomery St.
Champion M Co.	California.	24.	10.	10.	Apr 19.	May 31.	June 21.	T. Wetzel.	322	Montgomery St.	322 Montgomery St.
Challenge Con M Co.	Nevada.	3.	30.	30.	May 25.	June 26.	July 16.	O. L. McCoy.	329	Pine St.	329 Pine St.
Europa M Co.	Nevada.	9.	25.	25.	Apr 5.	May 12.	June 7.	J. Morizo.	328	Montgomery St.	328 Montgomery St.
Gray Eagle M Co.	California.	9.	01.	01.	May 17.	June 22.	July 11.	T. Wetzel.	322	Montgomery St.	322 Montgomery St.
Golden Fleece M Co.	California.	9.	10.	10.	Apr 26.	June 3.	June 30.	W. J. Gleason.	320	Montgomery St.	320 Montgomery St.
Hubert Concentrator Co.	California.	2.	10.	10.	May 10.	June 16.	July 18.	M. Livingston.	320	Montgomery St.	320 Montgomery St.
Heath M Co.	Idaho.	1.	15.	15.	May 20.	June 30.	July 25.	W. L. Oliver.	328	Montgomery St.	328 Montgomery St.
Julia Con M Co.	California.	22.	15.	15.	Apr 18.	May 24.	June 15.	J. Stadfield.	419	California St.	419 California St.
Morrill Con M Co.	California.	2.	05.	05.	Apr 31.	May 23.	June 10.	W. O. Distrell.	312	Montgomery St.	312 Montgomery St.
Mountain Tunnel M Co.	California.	4.	20.	20.	Apr 15.	May 23.	June 13.	A. B. Paul Jr.	328	Montgomery St.	328 Montgomery St.
New Coso M Co.	California.	20.	10.	10.	Apr 15.	June 1.	June 25.	J. J. Hunt.	308	Montgomery St.	308 Montgomery St.
Phil Sheridan M Co.	Nevada.	1.	10.	10.	Apr 15.	May 25.	June 15.	J. J. Scoville.	309	Montgomery St.	309 Montgomery St.
Sierra Nevada S M Co.	California.	88.	25.	25.	Apr 13.	May 25.	June 6.	E. S. Parker.	328	Montgomery St.	328 Montgomery St.
Scorpion S M Co.	Nevada.	21.	10.	10.	Apr 27.	June 3.	June 20.	G. B. Spunney.	310	Pine St.	310 Pine St.
Trojan M Co.	Nevada.	15.	10.	10.	Apr 28.	June 2.	June 30.	J. J. Scoville.	309	Montgomery St.	309 Montgomery St.
Venus M Co.	California.	1.	10.	10.	Apr 28.	June 30.	June 17.	D. Buck.	309	Montgomery St.	309 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.		LOCATION.		SECRETARY.		OFFICE IN S. F.		MEETING.		DATE.	
Crown Point M Co.	California	1.	329	Montgomery St.	329	Montgomery St.	329	Annual.	June 4	June 4	June 4
Caledonia M Co.	California	1.	329	Montgomery St.	329	Montgomery St.	329	Annual.	June 4	June 4	June 4
Eureka Con M Co.	California	1.	230	Montgomery St.	230	Montgomery St.	230	Annual.	June 4	June 4	June 4
Gagler G & S M Co.	California	1.	126	Keary St.	126	Keary St.	126	Annual.	June 4	June 4	June 4
Golden Gate M Co.	California	1.	330	Montgomery St.	330	Montgomery St.	330	Annual.	June 7	June 7	June 7
Morning Star Con M Co.	California	1.	318	Pine St.	318	Pine St.	318	Annual.	June 6	June 6	June 6
Trinity River C & H M Co.	California	1.	318	Pine St.	318	Pine St.	318	Annual.	June 6	June 6	June 6

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.		LOCATION.		SECRETARY.		OFFICE IN S. F.		AMOUNT.		PAYABLE.	
Con. California & Va M Co.	California	1.	309	Montgomery St.	309	Montgomery St.	309	50.	Apr 7	Apr 7	Apr 7
Dorchee Blue Gravel M Co.	California	1.	622	Montgomery St.	622	Montgomery St.	622	13.	May 19	May 19	May 19
Original Hidden Treasure.	California	1.	401	California St.	401	California St.	401	13.	Apr 25	Apr 25	Apr 25
Plymouth Con M Co.	California	1.	25.	Apr 25	Apr 25	Apr 25	Apr 25	25.	Apr 25	Apr 25	Apr 25
Pacific Borax, Salt & Soda Co.	California	1.	431	California St.	431	California St.	431	10.	Apr 7	Apr 7	Apr 7
Parade Valley M Co.	California	1.	328	Montgomery St.	328	Montgomery St.	328	10.	Apr 15	Apr 15	Apr 15
Silver King M Co.	California	1.	328	Montgomery St.	328	Montgomery St.	328	25.	May 15	May 15	May 15

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, June 2, 1887.

ANTIMONY—French Star.	71 @ 84
IRON—Glenbrook ton.	@ 27 00
Elgin ton.	@ 25 50
American Soft, No. 1, ton.	@ 28 00
Oregon Pig, ton.	21 @ 23 00
Clippage Cap, Nos. 1 & 4.	22 @ 23 50
Olay Lane White.	22 @ 25 00
Shots, No. 1.	28 @ 00
COPPER—	
Boit.	19 @ 21
Sheathing.	18 @
Ingot.	12 @ 19 1/2
Fire Box Sheet.	@ 21
LEAD—Pig.	@ 5 00
Bar.	5 25 @ 5 60
Sheet.	8 @
Shot, discount 10% on 500 lbs. Drop, 3 bag.	1 50 @
Ruck, 3 bag.	2 00 @
Chilled, do.	2 20 @
QUICKSILVER—By the flask.	40 @ 00
Flasks, new.	1 06 @
Flasks, old.	5 @ 00
SPECK—English B.	16 @ 25
Black Diamond, ordinary sizes.	8 @ 15
Pow.	3 @ 6
Machinery.	31 @ 6
Naylor & Co.	14 @ 14
Zinc—Cast.	8 @ 9
Sheet, 7/32 to 1/16 lb. less the oak.	61 @ 9
TEMPLES—Ooke.	4 90 @ 4 95
Onbaroo.	6 25 @ 6
BORAX—San Bernardino.	71 @ 8
Attaguaya.	@ 5

New York Metal Market.

Telegraphic advices dated June 2d give the following

New York prices:

BAR SILVER—95c per oz.

BORAX—61@67c.

COPPER—LARS—\$10.40.

IRON—No. 1, \$22.00.

LEAD—\$4.30@4.36.

QUICKSILVER—\$30.65c.

The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Steady. Spot closing at \$9.90@9.95. Transferable Notices (Lake) issued at \$9.95@—, Transferable Notices (Chili Bars) issued at \$9.35.

LEAD—Firm at \$4.66@4.70 spot. Transferable No. 1 notices issued at \$4.57.

TIN—Quiet at \$23.00@23.05. Transferable, notices issued at \$23.80.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, \$22.00@23.25; Billion Tin, \$23.60@23.60; Banca Tin, \$23.00@24.00; Baltimore Copper, \$9.06@9.25; Orford Copper, \$9.00@9.26; P. S. C. Copper, \$10.00@10.26; Foreign Lead, \$1.65@4.70; Foreign Spelter, \$4.70@4.76; Antimony, \$7.66@7.70.

MARKETS PRICES—At tidewater. 100-ton lots of listed lumps (when brass is specified) range normally about as follows: Beach, Grade No. 1, \$20.50@21.00; No. 2, \$19.60@21.00; Grey Forge, \$17.60@19.00; Hudson River, Grade No. 1, \$20.60@21.50; No. 2, \$20.00@21.00; Grey Forge, \$17.50@19.00; Southern, Grade No. 1, \$21.60@22.00; No. 2, \$21.00@—; Grey Forge, —@—.

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OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

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CRO. McDONNELL—Ventura and Santa Barbara Cos.

J. L. DOYLE—Alameda Co.

W. J. FARRER—California and Nevada.

SILAS PATTER—Colusa Co.

WILLIAM POOL—Fresno Co.

M. S. PRIMS—Alameda Co.

R. C. HUSTON—Butte, Montana.

E. P. SMITH—Humboldt Co.

S. J. LITTLEFIELD—San Diego Co.

EDWARD WRIGHT—Shasta Co.

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Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not subscribe to notify us to discontinue it, or some irremediable party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

SEVERAL HUNDRED TONS of nitrate of soda were burned at the Giant Powder Works on Saturday last. Burning shingles from the fire were carried by the wind to the Jackson Powder Works, near by, and a pile of unrefined sulphur also caught fire. The high explosives in the adjoining buildings and the office furniture and other portable property were at once removed to a place of safety. The total loss from the fire will amount to not quite \$4000.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.		WEEK ENDING MAY 12.	WEEK ENDING MAY 19.	WEEK ENDING MAY 26.	WEEK ENDING JUNE 2.	
Alpha.	3.50	3.75	3.00	4.50	3.30	4.25
Alta.	2.60	3.10	2.35	4.40	2.80	4.15
Andes.	1.55	1.70	1.60	2.30	1.75	2.10
Argenta.	25	30	25	35	30	33
Belcher.	3.75	4.00	3.50	6.25	4.00	5.50
Brophy.	6.80	7.25	111	7.75	107	7.75
Best & Belcher.	2.30	2.45	2.30	3.10	2.45	2.90
Bullion.	95	1.00	95	1.30	1.00	1.25
Baltimore.	70	75	65	90	80	85
Bodie Con.	2.50	2.70	2.55	2.90	2.10	3.00
Benton.	1.30	2.00	1.05	1.35	1.00	3.00
Bodie Tunnel.	1.30	1.30	1.30	1.30	1.30	1.30
Bulwer.	1.30	1.30	1.30	1.30	1.30	1.30
Cal. & Cal.	144	154	144	24	181	23
Challenge.	3.20	3.20	2.60	3.00	2.00	2.75
Champion.	6.25	6.25	6.50	6.00	7.25	8.50
Chollar.	2.30	2.30	2.30	2.30	2.30	2.30
Confidence.	8.50	8.50	8.50	10	8.25	10
Con. Imperial.	1.80	1.80	2.00	2.00	2.25	1.90
Caledonia.	60	70	65	80	70	90
Con. Pacific.	35	35	35	35	35	35
Crown Point.	62	60	51	72	60	67
Crocker.	3.20	80	50	1.00	90	1.00
Crocker.	3.20	80	50	1.00	90	1.00
Dudley.	2.40	2.40	2.40	2.40	2.40	2.40
East B. & B.	1.36	1.36	1.36	1.36	1.36	1.36
Eureka Con.	4.30	6.25	6.50	6.25	6.25	6.50
Eschwege.	1.55	1.50	1.50	1.60	2.00	1.60
Gold Friz.	1.10	1.15	1.10	1.15	1.30	1.50
Gold & Curry.	1.20	1.20	1.20	1.20	1.20	1.20
Hale & Norcross.	4.60	4.95	4.75	6.50	6.50	6.00
Holmes.	2.50	2.50	2.50	2.50	2.50	2.50
Independence.	35	35	35	35	35	35
Iowa.	35	1.00	1.25	1.50	1.30	1.50
Julia.	1.20	1.20	1.20	1.20	1.20	1.20
Justice.	1.20	1.60	1.30	1.70	1.50	1.65
Kentuck.	1.60	1.60	1.60	1.60	1.60	1.60
Lady Wash.	1.60	1.00	1.85	1.05	1.95	1.30
Martin White.	2.00	2.75	2.50	2.85	2.75	2.50
Mexican.	4.50	5.25	4.90	7.25	6.75	7.00
Mt. Diablo.	1.00	1.00	1.00	1.00	1.00	1.00
Northern Belle.	1.20	1.25	1.25	1.40	1.25	1.40
Navajo.	1.20	1.25	1.25	1.40	1.25	1.40
Nevada Belle Isle.	7.50	8.00	8.50	9.50	6.75	1.10
Niagara.	3.20	3.75	3.20	3.95	3.95	4.70
Nev. Queen.	3.20	3.75	3.20	3.95	3.95	4.70
North G. & C.	3.20	3.75	3.20	3.95	3.95	4.70
Occidental.	2.90	3.40	2.95	4.10	3.50	4.10
Opfir.	3.90	9.00	9.00	3.90	7.75	11
Potosi.	1.50	1.80	1.80	2.50	1.95	2.45
Peerless.	7.25	7.75	5.50	10.25	9.00	8.85
Peerless.	5.50	6.00	6.00	8.50	7.75	7.75
Peerless.	5.50	6.00	6.00	8.50	7.75	7.75
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Peerless.	5.50	6.00	6.00	8.50	7.75	7.75
Peerless.	5.50	6.00	6.00	8.50		

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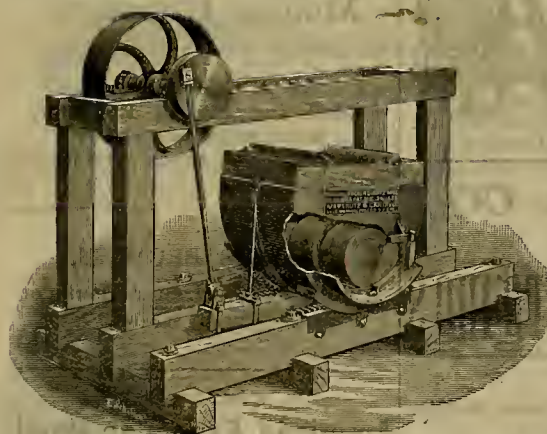
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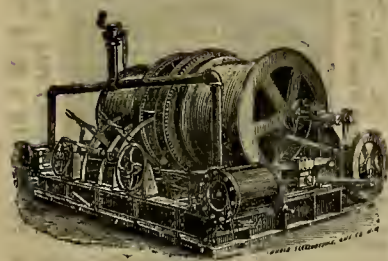
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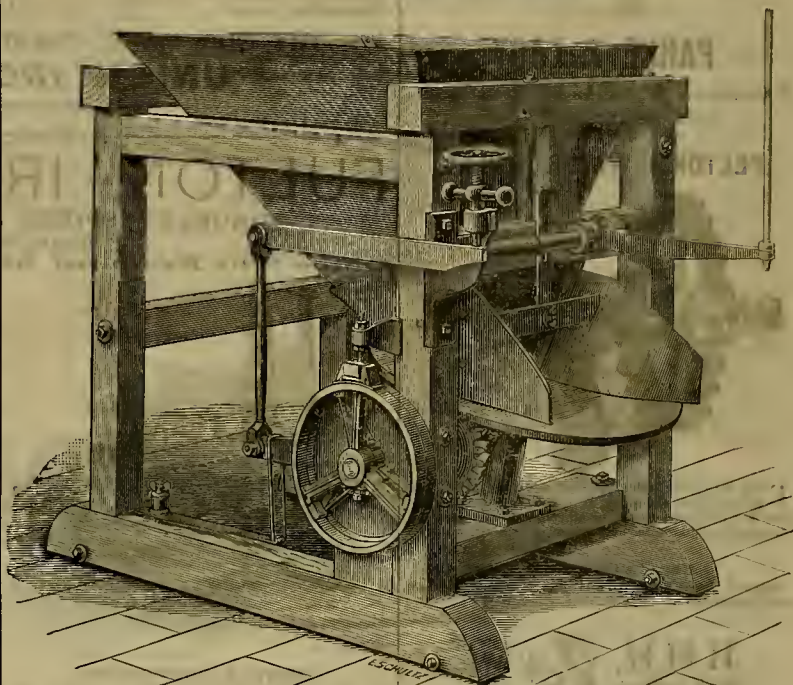
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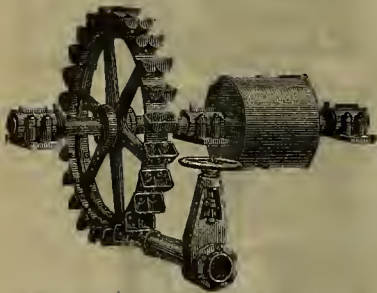
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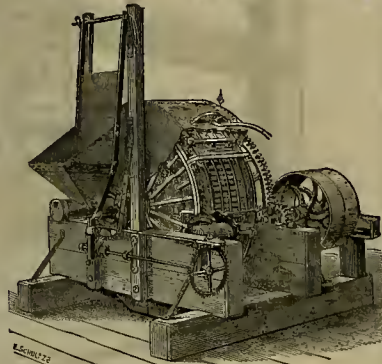
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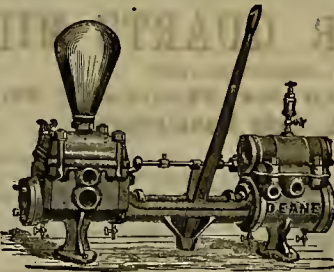
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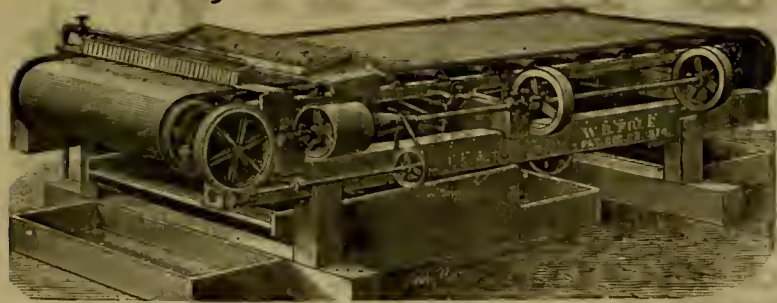


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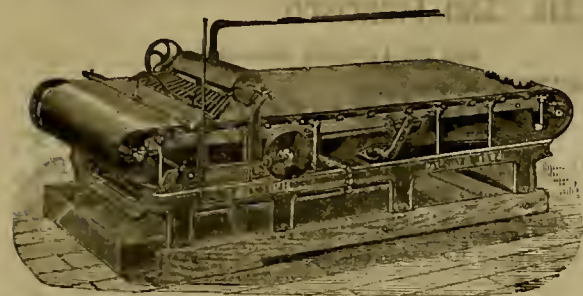
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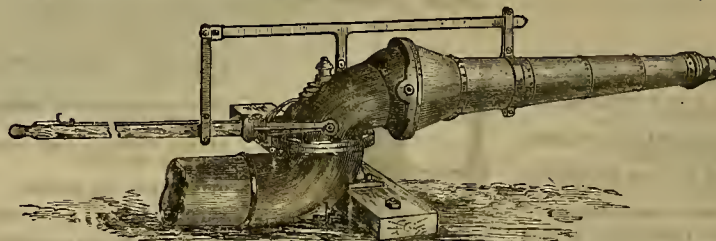
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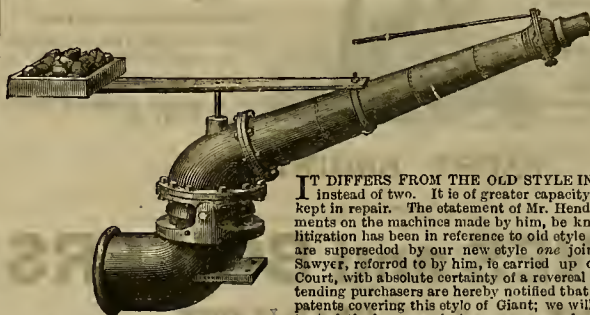


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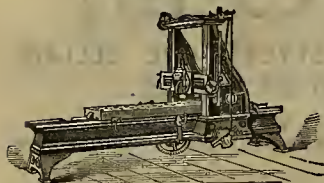
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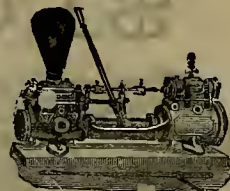


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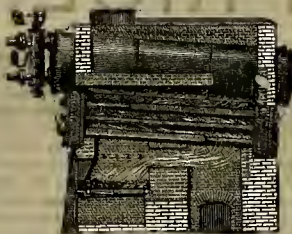
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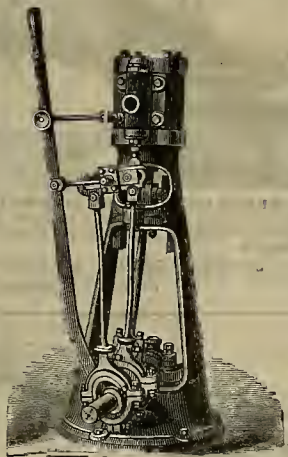
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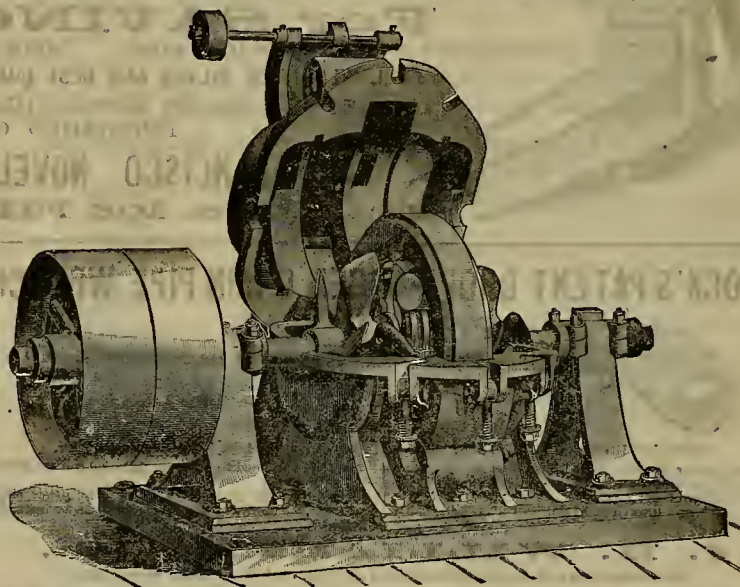
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Any method of amalgamation may be applied.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JUNE 11, 1887.

VOLUME LIV
Number 24.

The Bryan Roller Quartz-Mill.

The Bryan roller quartz-mill, manufactured by the Risdon Iron Works in this city, has recently been doing some very good work in ore-milling. The mill is very simple in construction, as the engraving shows. It requires no framework, but is built ready for its foundation.

A glance at the engraving will show the plan and construction. It consists of three steel-tired rollers, which run over steel dies in an annular mortar. An iron tank or drum, around which the actuating belt passes, bears on the face of the rollers and increases their crushing force. These rollers are 30 inches in diameter and six inches thick, and each weighs 1200 pounds. Each steel roller is provided with a tire $2\frac{1}{2}$ inches thick, and is of uniform size, so that it can be removed and replaced with facility. One set of tires will crush fully 1600 tons before renewal.

The axles are fixed solid in rollers and are journaled on an annular plate, which rotates loosely around the solid center post, and all the bearings are thoroughly lubricated by oil channels, so arranged as to absolutely prevent the oil from entering the mortar. The solid center post is stepped in the mortar and is supported firmly by suitable devices; it enters the bearing plate of the drum, which, with the rollers, rotates round the post as a common center.

A very important feature of this roller-mill is the device for keeping the rollers clean from pulp. It consists of an adjustable spring and scraper (shown in the engraving), which follows each roller in its rotation. The spring is set to the die and its tension is readily adjusted. The direct purpose of the scraper is to keep the face of the die, and the roller also, clean from pulp, which otherwise would collect and adhere to the roller and reduce its crushing force. The scrapers serve also to discharge the pulp, and to distribute and equalize on the dies the ore received from the feeder.

The mortar is provided with three openings for the screens, which are four feet long by five inches wide, and usually No. 40, giving ample surface for discharge. The chute for carrying off the pulp extends round the mortar to the spout over the apron.

In the operation of the mill the pulp runs around the mortar; next to the screens, in a rapid current of not less than 300 feet per minute; but toward the center, inside of the rollers, the movement of the pulp is much slower, and as the gold is liberated from the matrix it falls to the eddy side of the current, and in practice is found amalgamated in mass around the cone in the center of the mortar. By this action the free gold is not subjected to the continuous grinding of the rollers in the mass of pulp, and nearly all the gold contained in the ore, fully 90 per cent, is retained in the mortar. It is stated that the ore does not slime, and the sand and pyrites are left of uniform size and in the best condition for concentrating. The "clean-up" of the mill, owing to its simple arrangement, is done with ease.

The movement of the mill is at the rate of about 50 revolutions per minute, and it is almost noiseless. It requires less than five-horse power to run it, and will crush about 14 tons in a day with No. 40 screens. The capacity of the mill can be varied by weight in the tank pulley, which rests on top of the rollers. The

mill is made of the best quality of iron and specially selected steel, and is thoroughly finished in all its parts. The mortar, with the obute and spout, is generally cast in one solid piece, but for transportation by packing in the mountains, the mortar is specially cast in sections weighing 300 pounds. The whole weight of the mill is about $5\frac{1}{2}$ tons. The cost is \$1500 complete with aprons, silver plates, etc. Challenge ore-feeders are used, but are not furnished with the mill.

This roller-mill is adapted for any gold mine, large or small. A party of miners, having little means and owning a small gold mine, can get the gold from their ore and "pay as they go." One is now at work on the Little Amador mine, Amador City. Another was recently shipped to Savannah county, Virginia, for a

Gold in India.

For more than 2000 years the inhabitants of the civilized world have obtained most of their costly silks, rich spices and some other articles of luxury from that portion of India now ruled by the British. In payment of these commodities, gold only was at first received, except in so far as the English have been able to substitute certain of their manufactured goods for the precious metal. How much gold, first and last, has for such purpose gone into that country is, of course, unknown, though its value must run up into the billions. It is by some writers on the subject calculated that more than a billion has been "hoarded," with nearly as much more manufactured into articles of ornamentation or use. Of this gold, none has

Where They Are.

It has long been matter of observation that but few quartz veins have ever been found in the immediate vicinity of our leading drift mines. This class of deposits, so far as surface exposure is concerned, is noticeably absent in and along Slate Creek basin and about Bald Mountain, Sierra county; around You-Bet, Red Dog and Liberty Hill, Nevada county, and along the Forrest Hill divide, Placer county, all prominent drift-mining localities. The deep placers at these several points having been extremely rich, it has, by some of our thoughtful students of the geology of this region, been surmised that the quartz lodes were not here wholly wanting, only that they failed to come to the surface—in other words, they exist, but are deeply buried under the diluvial drift that once covered to great depth this portion of the foothill country.

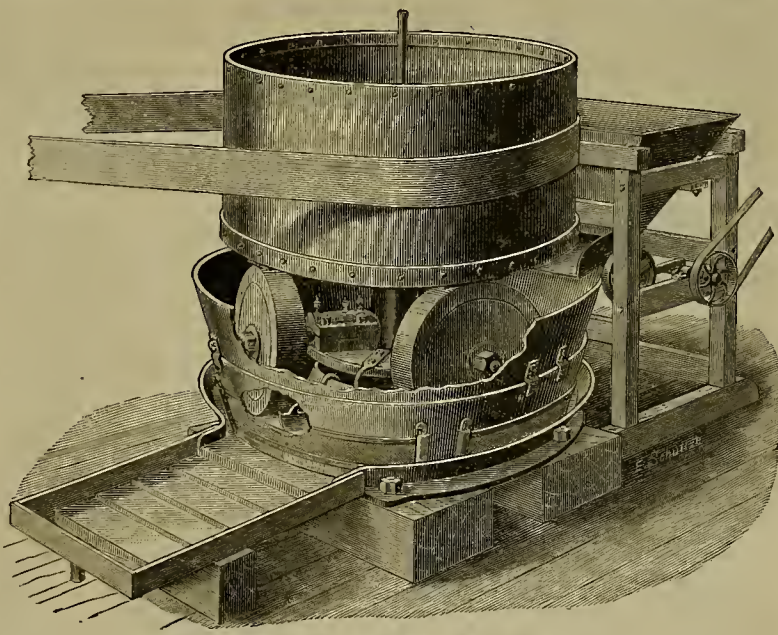
This theory seems very reasonable, since it is hardly to be supposed that the quartz belt, elsewhere so conspicuous along this range, should have been intermitted at these, the richest points in placer deposits along its whole course. Nor have they been, as recent developments tend to show. During the past year large and valuable quartz veins have been uncovered in several of the drift mines on the Forrest Hill divide, though there are no surface indications of quartz in the vicinity. Preparations are being made to work some of these deposits, which, of course, can be done at little expense, tunnels having already been driven to them.

It will not be strange if quartz veins should be struck in other of our drift mines. They, no doubt, extend continuously along the main gold belt, and if not everywhere encountered in drifting, it will be because the work of exploitation has not been carried sufficiently far down or may not be prosecuted at the exact point where they happen to exist.

The uncovering of quartz deposits in the hydraulic washings has in this State been of frequent occurrence. What is considered an important development of this kind took place not long ago on Scott river, Siskiyou county, the vein here exposed being a very powerful one, and portions of it rich in free gold. A mill is about to be put up for crushing this ore, some of which has already been worked with excellent results. Since the bars along Scott river were exhausted, the channel of that stream has been the theater of the most extensive river-bed operations ever carried on either here or elsewhere. Wherever worked, the bars as well as the bed of that river have yielded largely, and, although the gold that enriched both came originally from the quartz veins in the vicinage, few of these show more than the faintest outcrop, some, like the one above mentioned, no outcrop at all. What new source of California's hidden wealth shall next be revealed we wait to record.

THE ACADEMY OF SCIENCES at its last meeting adopted a resolution to hold a special executive session to consider the propriety of borrowing money from the Lick Trust with which to put up a new building on Market street.

THE receipts of coal at this port in May were 79,100 tons, making a total since January 1st of 420,000 tons, against 290,300 tons during the same time last year. The receipts this year are heavy.



THE BRYAN ROLLER QUARTZ MILL.

gold mine there. Two are in use at a mine in Durango, Mexico, where they have been giving satisfaction for some considerable time.

PIONEER MINERS.—The Pioneer Miners' Association met this week to act upon the report of the committee appointed to draft a constitution and by-laws, President Rutherford, of Oakland, occupying the chair. The report which was adopted makes an important change in the qualifications of the persons eligible for membership. It was originally provided that only those who had been residents of a mining district prior to 1857 should be eligible. A communication from the secretary of the National Association of Pioneers stated that all persons who were residents of the State prior to 1860 were eligible, and it was decided to make that year the limit in the Pioneer Miners' Association. The initiation fee was fixed at \$3 and the yearly dues at \$2.50. The directors will meet and fix the date of the annual meeting of the association, which, it is generally understood, will be made to fall on the date of Marshall's discovery of gold. This will not apply to the present year, as the first annual meeting has already been set for July 7th, the date of the raising of the first American flag at Monterey.

been coined; as a circulating medium, the whole has, therefore, been lost to the world.

It is now suggested that the mint at Madras and Calcutta be opened to the coinage of this metal into English sovereigns, whereby it is thought much of it could be made available for monetary purposes.

That such will be the result is, however, more than problematical. The natives of that country disposed of their gold in the manner mentioned as a means of saving it, knowing that if converted into coin it would soon slip from their possession. When shaped into jewelry, utensils, trinkets, etc., not being exchangeable for other things, they had no alternative but to keep it and thus he always endowed with a certain amount of intrinsic wealth, which could be easily concealed from their rapacious oppressors and at the same time be made available in an emergency. These ideas, no doubt, still obtain among these native races. In India, silver is and always has been a legal tender to any amount, at the option of the payor. This metal, with the inhabitants of that country as with most Oriental peoples, has always been the favorite coin, as it probably will continue to be, continuing India the great silver absorber of the world.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Southern California.

[No. 3.—CONTINUED.]

[Editorial Correspondence.]

The City of San Bernardino.

Coming back to the city, we find a thriving, beautiful town, containing a population of from 6000 to 7000 souls—nearly double that of one year ago. This city, as incorporated, is laid out just one mile square. This center of the main street constitutes a portion of the east and west base line from which all the Government surveys in the southern part of the State start north or south. This is known as the Mount San Bernardino base line. This city presents a bustling scene of activity; it is being well and substantially built, and is ornamented with a great number of fine public buildings and elegant private residences, with roomy grounds elegantly laid out and beautified with trees, plants and lawns; while from every direction the eye and senses are delighted with the beauty and fragrance of the orange, the lemon and every variety and color of shrub and flower. As already remarked, the climate of San Bernardino is delightful. The summer tradewinds from the ocean, as they reach this city after a passage through the San Gabriel valley, are mild and invigorating. The thermometer sometimes reaches 100° or 110°, but even at the latter point the air is not as oppressive as in San Francisco at 90°. This fact is due mainly to the cool air which comes down from the mountains during the night, cooling and gently modifying all the surrounding country from the noontime heat of the previous day.

San Bernardino County

Is the largest in the Union. It is a dominion in itself, exceeding in extent of area several important kingdoms and republics of Europe. It is double the size of the State of Massachusetts. It is one of the oldest American settled portions of California. True, much of the larger portion of its area is mountainous and comparatively barren; but it nevertheless contains within its borders, some of the finest lands on the Pacific Coast, and there are none which excel it in the production of tropical fruits. There is scarcely a product of earth, mineral or vegetable, that cannot be produced in some portion of San Bernardino county. Even its most rugged mountains are not devoid of value, as they contain some of the richest mines in the State, and afford opportunities to gather up from their snow-capped summits winter water, which may be held and distributed as it is wanted during the drouths of summer. An important enterprise in this direction is just now being started by Maj. Bonebrake, who owns some 50,000 acres of land on the great plains north and west of San Bernardino. The winter waters of Lytle creek are to be utilized and stored up much after the manner of the Bear valley enterprise, which will furnish water sufficient to irrigate from 15,000 to 20,000 acres of the land above referred to.

Colton,

Situated directly upon the Southern Pacific railroad, four miles from San Bernardino, is rapidly assuming considerable importance as a business center and shipping point. Fourteen years ago the ground upon which the town stands was a worthless waste. Now it is an important railroad center, with a population of about 2000 souls, with a bank, cannery, fine stores, hotels, and a constantly increasing line of general business. The Southern Pacific and Atchison, Topeka & Santa Fe lines cross each other at Colton. It is connected with San Bernardino by a motor road, and another similar road will be built this summer to connect Colton with Redlands and Lugonia. The latter will be a broad gauge and fitted for both freight and passenger traffic. It is a terminal point of traffic on the Southern Pacific. The town is growing rapidly and increasing in wealth and importance. A fine hotel has been projected to be built upon Silver mountain, a short distance from the town. It will be built under the patronage of the Southern Pacific railroad, and will rival in magnificence and outlook the famous Raymond at Pasadena.

RIVERSIDE.

The fairs of Riverside has become world-wide. It is a city of gardens—the whole a beautiful park. It is made up of beautifully embowered homes—of elegant villas surrounded by groves of orange and lemon trees. The scenery of Riverside is superb. Flowing streams and delightful homes with fruit, foliage, plants and flowers in endless variety, comprise the foreground; while abrupt but shapely hills, backed by lofty mountains, fill the distant perspective. The climate is delightful—there is no winter, while the heat of summer is so tempered as not to be oppressive. It is indeed

"A Paradise to mortals given,
To make us think the more of heaven,
To make us prize the blessings given,
Where hills and mountains e'en surround,
Lulled by the winds to calm profound."

It is one of the most prosperous and beautiful settlements in Southern California. Fifteen years ago it was nothing but a barren desert,

dry, uninviting and of little value. Now it is a prosperous city of some 5000 or 6000 inhabitants, with fully 6000 acres covered with grapes, oranges and lemons, all under a state of cultivation nowhere excelled on earth. Magnolia avenue, the most beautiful drive in California, extends for some eight miles directly through the center of the city, bounded on either side by rows of palm, cypress, paper and eucalyptus trees, with hedges half concealing yet ever revealing continuous orchards and groves of orange, lemon, lime, olive, apricot, etc., interspersed with vines. Riverside is the center of citrus fruit culture in California. Not only does it excel any other locality, either in California or Florida, in the extent of its orange groves and the amount of fruit produced, but it is the most free from insect pests, and its fruit commands the highest price in the markets.

As a Raisin-Producing District,

It is equally well known. Its raisin product for the last six years has been as follows, expressed in boxes: 1880, 20,000; 1881, 40,000; 1882, 50,000; 1883, 70,000; 1884, 85,000; 1885, 110,000. The reader will notice the gradual annual increase of production. The amount of the product for 1886 is not before us as we write, but the total receipts therefore were something over \$200,000. Five hundred carloads of green and dried fruit were shipped from Riverside last season.

Old Riverside.

Those who were present at the late Fruit-Growers' Convention, held in Riverside, cannot fail to recollect the graphic description of the country in and about Riverside as given by the venerable General Vallejo as he saw it before any attempts had been made to introduce American improvements. It was then a pathless desert—beautiful and green in springtime, but dry, dusty and sun scorched the balance of the year. In time came the American sheepherder, who pastured his flocks upon those broad plains, then uninviting and apparently valueless to any other use. Gradually this sheepherder passed away and men with brains and energy came upon the scene. The soil was evidently rich and inviting, as was proven by the appearance of the old San Bernardino Mission and the new San Bernardino town which was springing up near by—each in districts well watered by artificial means. Hence there was no reason why other settlements might not be made with equally successful results. To this enterprising man from the East, a practical conception is quite generally carried out to its legitimate results, and no sooner was this idea conceived than capital was raised, engineers engaged and extensive works set on foot to bring in water from the adjoining Santa Ana river for irrigating purposes.

Mecical Changes

Were soon wrought out. Chaired by the refreshing water, tickled by the plow and harrow, and urged and encouraged by the persuasive energy of the enterprising and intelligent cultivator, the once dry land soon began to bloom with every variety of blossom for fruit and flower, and we now behold thousands of acres of vineyard and orange and lemon groves, with miles upon miles of green and shaded avenues, dotted all along with cottages and villas, denoting the presence of happy and prosperous homes. Land that but a few years ago was not worth the care of occupancy is now readily selling with its improvements at from \$400 to \$2000 per acre. Business lots, in the center of the town, that two or three years ago were selling at from \$1000 to \$10,000 each, are now bringing from \$10,000 to \$15,000.

Homes and Investments.

From what has been said it will be readily seen that Southern California, and especially the upper portion of the San Gabriel valley and the San Bernardino valley as well, present most favorable advantages to the seekers for homes, where a few thousand dollars of ready money are at command for the establishment of a country home, which may also be made a source of permanent and annually increasing income. The well-known climatic advantages of Southern California first induced settlers to go there in search of health. Many of these people had before made annual visits to Florida, on the same errand; but on once trying California they found the conditions so much more favorable that they have ever since continued to "go West" instead of "South." These advantages are now so well known to this great crowd of health seekers that the main tide of summer travel is turned in this direction, and while the hotels of Florida are nearly empty, it is almost impossible to increase the hotel accommodations of California fast enough to meet the vast demand. No invalid now thinks of going to Florida for a permanent home. The summer climate is baneful rather than otherwise; while California offers the highest climatic advantages to the invalid seeking a permanent home for himself and family, where he may not only enjoy all the health advantages, but where numerous opportunities are also presented for profitable investments on either a large or small scale.

Will this Boom Continue?

Most assuredly it will. So long as the same unpleasant climatic conditions exist east of the Rocky mountains, and so long as the mild climate of California continues to invite health-seekers, just so long will the present movement—or boom, as it is sometimes called—continue, at least until the country is literally filled with new-comers. There will always be a great army of persons at the East broken down in health by

the rigors of the climate—persons who have made money and are well-to-do, and who are desirous and abundantly able to better their conditions, who will turn their faces to these Western shores. This army is being more and more largely recruited every year. No human agency can change the climatic conditions at the East, and no human power can prevent the suffering ones from seeking relief in the mild perennial spring and summer of Southern California. There will be enough of them who will come every year—many thousands who will come to stay. This is quite unlike the ordinary tides of human movement, which are usually set up by accidental circumstances, in which the moving cause soon disappears. In this case the cause is as immovable as the laws of nature, and nature alone has power to stop the movement. When the conditions are exhausted; when there is no more land that the wealthy invalid can buy, even at high fancy prices, then we may look for a cessation of the present influx into California—and not till then.

The Great Rush of '49 and '50

Is being repeated. The chief point just now is Southern California; it is already spreading north. The lower San Joaquin is beginning to feel the overflow from Los Angeles. This movement will undoubtedly be continued until the population of every portion of the State, from Oregon to Mexico, has been largely increased. Every part of California possesses climatic and other advantages for homes and business far superior to what can be generally realized in any of the States east of the Rocky mountains. The boom of the early years of California was initiated and kept up by the richness and abundance of her mines. When they began to be measurably worked out the boom as a matter of course died out. The climate and wonderfully productive nature of our soil, both of which are new discoveries to the majority of our Eastern friends, are the moving agents in the present boom. Neither climate nor soil will decrease in value or desirability, hence there will be no material diminution in the movement in this direction until the State is fairly filled up with people—not until they can be numbered by millions. W. B. E.

The Cœur d'Alene Mines.

[From our Correspondent, R. G. HUSTON.]

This much-abused section of country is now fast making its way in the world. The last town of prominence is already in direct communication with the outside world by rail and steamboat. Leaving the N. P. at Hauser Junction, we go by rail to Cœur d'Alene City and Fort Sherman. They lie side by side on the shore of the lake, a most picturesque spot, and one that should attract the attention of tourists from the East and West as they are crossing the continent. It is a lovely spot to rest a few days to fish and hunt. From here it is 60 miles across the lake and up the river to the Mission. The town of Wardner is the outgrowth of the discovery of the Sullivan and Bunker Hill

Mines on Milo Creek.

These properties showed up such immense bodies of ore at the surface, that a contract was let for the concentrating of 50,000 tons. From that time the growth of the camp has been as phenomenal as the old-time placer-mining camps.

Portland capital having been on the lookout for some time for outside investments, has been the first to get into this new section. In the immediate vicinity of Wardner, they have succeeded in purchasing nearly all the properties that have made any development. They have the Sierra Nevada; this is probably the richest ore in the camp, as wire silver is frequently come in contact with in mining their ore. Then they have the Tyler, Semwinder, and now the Sullivan and Bunker Hill group have been acquired at an expense of about \$1,000,000. All of these properties carry galena and silver in paying quantities.

It is only a fair business proposition when so much capital has been invested that improvements will be made, plants put in, and a large amount of money disbursed. This will be of great benefit to the many prospectors in this country, as it will give them funds to procure the necessary "grub stake" to continue prospecting.

Leaving Wardner and

Following up the South Fork,

We soon come to the Goldsmith. This is a gold-bearing ledge and was sold to some Louisville parties some time ago. It is their intention to place a plant on their property this coming season. From here on, up the South fork to Nigger Prairie, there are many discoveries and locations, but comparatively little development, except on Canyon creek and at Mullan. The Tiger mine, on Canyon creek, is about as thoroughly a prospected mine as there is in the section. Here a number of tunnels have been run on this vein at different levels, and in the lower level a shaft has been sunk over 100 feet in depth, thus developing this continuity of the vein and proving it to be a mine in reality. The ore carries a large percentage of lead and a sufficient amount of silver to make it a fine-paying investment for capital to place a first-class plant on for the reduction of the ore. This, with the fact that ere another winter arrives, a railroad will be running to the

junction of Canyon creek and the main South Fork, and that they will be able to ship their ore at a profit, makes the outlook a flattering one. The present owners are undoubtedly men of means, or they could not have done the amount of development work. Messrs. Glidden and Burks have, I think, one of the star properties of the Cœur d'Alene mines.

Many extensions have been located here, and more or less work is being done, according to the inclination and wealth of the owner. The Hidden Treasure, the first extension west, is under a bond of \$15,000 to Messrs. Armstrong & Co., but on account of the very deep fall of snow this winter, they have thus far not been able to do much in the way of development work.

Diamond Hitch

Is one of the oldest locations next to the Tiger in this district. It is owned by Reeves & Kaiser, and they have a level run for some distance, and a shaft from the end of this level, sunk to a depth of 100 feet. In this shaft they have some very fine ore of different characters, in which silver is found. It is native silver in slabs. They also get some sand carbinates that are very rich. This property is for sale, as the parties are unable to properly develop it themselves, and have other prospects in the vicinity. They wish to dispose of one to provide themselves with means for the development of the others.

A number of fine prospects have been located and quite a large amount of work has been done on Nine-Mile creek, another tributary of South Fork, putting into it at Wallace, a short distance below where Canyon creek enters in. Two of the best ones are named respectively California and San Francisco. These properties carry a high percentage of lead and silver, and thus far their owners are satisfied with the outlook.

Mullan.

This town is nine miles further up South Fork and has already some very fine prospects, one of which, the Hunter, was sold a short time since to a representative of Dennis Ryan, of St. Paul, for \$80,000. They are now working a force of 18 men on this property and making a good showing. This is in the Nigger Prairie district. There are many other flattering prospects here. Among them is the Central, owned by W. G. Stagner & Co., who have a tunnel in 100 feet, and crosscutting the vein and showing a width of 20 feet. Much of this is solid galena running from 30 to 40 per cent lead and carrying lots of silver.

They have very high expectations of having railroad communication here by having the railroad from Wallace extended up the South Fork to this point. There is no doubt of the feasibility if the enterprise of the country shows up well enough to justify it.

The present objective point of the railroad is Wallace. This is a town in embryo at the junction of Nine-Mile creek with the main river. The location is quite central, and should the railroad people conclude to make this the terminus, will, no doubt, make quite a town, as it will be the nearest point for shipping for Delta, Myrtle, and Murray. As a matter of fact discoveries have been made and located all along from Wardner to Mullan and the owners are millionaires in prospect, the usual feeling for prospect-owners. These will come to a common center at Wallace. As the season advances many of these prospects will be energetically developed.

The county road leading from South Fork over to Murray, via Beaver creek and Trail gulch, is a very good one, and must have cost the county a round sum, as it is a heavy grade for about seven miles over a high divide.

Poney Gulch.

A tributary of Beaver creek, was this point of attraction about the time I passed through here. Capt. Herman & Co., who have been running a tunnel on the Fay Templeton lead, a free-gold prospect, had been having a fine showing of ore and were refusing an offer of \$100,000 for the property at that time.

This was sufficient to cause other property in the vicinity to rapidly appreciate, and an owner of one-sixth interest in the Mammoth, an extension of this same lead, sold for \$2000. The new town of Templeton was laid out and lots were being rapidly recorded. Real estate was booming, so to speak. Delta is at the junction of Trail gulch with Beaver creek, and has been built and kept up so far by the placer mines in Trail. The miners were just getting to work in good shape when I was there, and will no doubt have a good season of water this year.

John Harman is getting ready to operate his hydraulic elevator, having put in quite an extensive plant of pipe and ditch, and is this year expecting to realize on some of his investments.

I here met some of my old placer-mining acquaintances of many years ago—the Hauck Bros. They had run a long headrock drain to some ground in Trail gulch with rather indifferent success, but they are just now turning their attention to quartz and may soon be repaid for all their hard labor and investments in the placers of Trail.

Further up the gulch several other companies are operating with more or less success, but most of them are well pleased with their success. Among these are Frank Gordon, W. J. Nickerson, Chas. Fulton, and a number of others who have the good taste to be subscribers to the PRESS.

P. H. Mahoney, on Placer gulch, is working a few men with fair returns, and is comfortably

situated to stay with the country until he gets his claim worked out.

From here over to Murray is three miles, by what is called the Sky trail, and that is the way I went. I will frankly admit that I think the trail well named.

(To be Continued)

A Ventura County Bee-Ranch.

EDITORS PRESS:—On the western banks of the Saope river, near the mouth of the mountain canyon of that stream, about three miles northeast of the Saope depot of the coast extension of the S. P. R. R., is located the very fine apiary of R. Wilkin. We refer to the accompanying illustration as an accurate representation of the same. Mr. W. is an old Californian and apiarist, well informed in the science of bee-keeping, and considered first-class authority. We write these notes partly from personal inspection of the premises, and partly from information kindly furnished us by Mr. W. while at his apiary a few days ago.

Mr. Wilkin located here to be out of the way of other bee men, if that were possible. His has at this place 450 colonies. His hives are the simplest form of the Langstroth. The brood-chamber contains about 1900 inches. The upper story is the same as the lower, and the two are interchangeable. The covers and the bottoms are the same, two inches longer than the hive, so that when at the bottom, the extra in length projecting furnishes a good lighting place for bees. The ends of these hives are furnished with cleats, rabbeted down so as to nail from top and end. When the covers become old, or in the least leaky, they may be changed to the bottom.

Foundation comb is used so as to exclude drone comb as much as possible. It is thought drones will, in any event, be numerous enough for all practical purposes. Mr. W. makes his own foundation comb, by means of well perfected machinery.

The extracting house stands in the center of the apiary. This is for convenience of access, the rows of hives diverging from it in every direction. The house is a small frame, say 10 by 12 feet. In order to exclude bees, the door is so arranged that, upon passing, it always shuts to of itself, by assistance of a clock-spring. The frame of upper half of the walls, all around, is covered with wire cloth, which furnishes ample ventilation, making a very pleasant place for work, and a comfortably cool retreat during warmest weather. Grapevines, hanging in festoons around the eaves, during the fruiting season, present a most delightful picture.

The capping-box is 6 feet long, 2 feet deep, lined with tin. It has a false bottom of galvanized iron perforated, to drain the honey from the cappings.

The extracting tank is one of Mr. W.'s own getting up, is square, comes up against the end of capping-box so that the honey is easily drained from the capping-box through an opening leading into the tank. In capping, the honey-frame is rested upon an iron pivot, which makes it very easy turning from side to side.

An eight-framed comb revolving extractor is used. The honey flows from the extractor through a pipe to a

System of Evaporators.

These are four in number. Each is 12 feet long, 5 feet wide and 1 foot deep, holding about 5000 pounds honey; made of tin, and painted on the outside to prevent rust. A light wooden frame around the top of each evaporator helps to stiffen the sides and hold in place. Upon this rests a covering of muslin arched, which admits the heat of the sun, and yet serves to keep out insects, dust, etc. The muslin is supported by six cross-sticks elevated in the center and fastened at ends on to the wooden frame above sides of the evaporator.

It is necessary that the system occupy slanting ground, so that the honey may flow from the bottom of the evaporator next the extracting tank and in at the top of the next in order, and so on down through the series. From the lowest evaporator the honey flows into a 14,000-pound tank of galvanized iron. This may be of other material, such as wood lined with tin, etc. From this the honey is drawn into tin cans for shipment.

In the process of evaporation, any watery substance that may be mixed with the honey is removed, and the honey becomes thick and rosy. This seems to prevent, to a considerable extent, the tendency to granulation. Mr. W. has about five tons stored away in tin cans which was thus treated before canning, and which is now apparently as liquid as when first evaporated a year ago.

When first-class honey begins to flow, it is important to throw out all dark or second-rate honey so as to have the qualities distinct. This work should be done early in the season, so as to be ready for the new flow, as it is important to get the best honey on to the market early.

In case of an emergency in any season, these evaporators may be used for storing honey. They with the large tank have a combined capacity of

about 34,000 pounds. One of these evaporators turned over for a roof, temporarily boarded up at sides, furnishes a good winter store for the cans of honey remaining on hand.

Mr. W. has been shipping to England. He has, within the past four or five years, shipped to one firm there, in one and two-pound cans, sufficient to realize from the sale about \$40,000.

Heretofore, perhaps, at least nine-tenths of the honey of this county has been extracted, but there is now a tendency to give more attention to comb honey.

Until within the three years last past, foul brood existed in the county to a considerable extent, but since that time a County Foul Brood Inspector, appointed under a recent law, has condemned, and destroyed by burning, about 300 hives of bees. By this means the disease is now being kept in check, while it is reported that in some of the neighboring counties its ravages are considerable.

It is thought that within a radius of two miles from this apiary, there are now about 1800 colonies of bees belonging to various persons, and generally doing well. This shows the great abundance of bee forage in the county. This apiary last year produced 130 pounds of honey per hive, average. They



BEE RANCH OF R. WILKIN, VENTURA CO., CAL.

would, of course, still do better if there were fewer in apiary or neighborhood. This year it is not expected they will do so well, as the flowers, although blooming profusely everywhere, yet seem to be wanting in abundance of honey-yielding properties.

The leading honey-producing plants in this neighborhood are alfalfa, phacelia and wild mustard, which bloom early and give a start in the spring and during the breeding season. Then comes purple sage, then white sage and "wild alfalfa"—this last a plant of the broom family. These yield the main portion of the choice marketable honey sent away from here every season. The Tigon or bearberry and Sumac produce a fair honey. These are both shrubs of rather ornamental growth, the first well known in most timbered or mountainous parts of California for its dark serrated leaves and brightly scarlet berries, extensively used in many places in ornamentation at Christmas festivals, etc. Nightshade furnishes a poorer forage all the year round, and bees work on it in winter. There are, in the neighborhood, many other honey-yielding plants generally considered of minor importance. There is, at times, in certain seasons, an abundant supply of the famous white sage, which has been the means of making the attractive and delicious white honey of Southern California so well known in Eastern markets. McD.

The Leland Stanford, Jr., University.

This new temple of thought is born of a feeling that the great schools and colleges are not doing their whole duty by this busy, practical age; that they take too much time and load the mind with a deal of stuff that is useless. "An Oxford education," says Froude, "fits a man extremely well for the trade of a gentleman. I do not know for what other trade it does fit him as at present constituted." Speaking of his plans, Senator Stanford says: "I have in my business experience found that too much of the current college training launches young men on the world void of much practical knowledge of any calling that will enable them to earn their living. Scores of educated youngsters have been sent to me seeking employment, and I could not do anything with them because they would not fit in anywhere."

Now this may not be wholly a matter of observation; perhaps the Senator knows how it is himself. When he was an undergraduate, the chief business of the student was to dig Greek roots instead of living plants; to watch the apnea and flirtation of rabble gods rather

riculum that has become venerable as an old creed that is sacred in memory. Take an illustration that happens to be at hand. The Adelbert College of the Western Reserve University, in the beautiful city of Cleveland, Ohio, may be regarded as a fair average specimen of this class of schools. According to the printed curriculum of this institution for the year 1884, there are during the four collegiate years and two years of preparatory training in linguistic, metaphysical and mathematical studies, 3550 hours of recitation and lecture, while to the whole group of physical sciences are given only 236 hours. Think for a moment of the vast and wonderful developments of our mines of iron, gold and silver, coal, petroleum and salt, and of the agricultural wealth in a large measure due to practical geology, and what are we to think of a course of training that devotes only 54 hours all told to recitations in geology and 1361 to Latin and Greek? Consider the ravages of pests and parasites upon grain, fruit, fruit trees, the diseases of domestic animals and the millions annually lost from these causes, and yet not one hour is given in the whole college course to entomology or biology. Not the slightest aid is given to our farmers and fruit-growers in battling these myriad foes. In this institution there are 535 hours of recitation given to mathematics, largely to the abstract relations of time, space and number, to sines, tangents and arcs; the forms and orbits of the heavenly bodies, and not a single hour to the study of one's own body and the laws of hygiene. The planets and comets may whirl in conic sections, the moons of Jupiter wax and wane, and Saturn move on a retrograde path, much to the confusion of astronomers, and the average man not find his happiness and usefulness aided in the slightest degree by a knowledge of the fact; but if he violates the laws of his body through ignorance or intemperance, his whole life may pass into a total eclipse. This ought they to have done and not left the other undone.

With all due respect for the dons and their ancient dignities, the education that does not put a boy in the way of earning a good, honest living is of very little value, and this we take to be the central idea of Leland Stanford, Jr., University. It is true we have technological and industrial schools that train the brain, eye and hand together, and are doing an excellent work; in the chemical, physical, botanical or mechanical laboratory; in the drafting-room, at the forge, power lathe or planer; in the foundry, machine-shop, printing office, shop, garden, field and stockyard; but the trouble is, they stand alone or as adjuncts of colleges, with slender means, and are looked upon with ill favor by the college dons. What is needed is to honor and dignify industrial training, by taking it under the wing of a munificently endowed university, where a hand-saw and a Greek lexicon are alike honorable. This idea is not novel nor experimental; it is in successful operation at the California State University and several other State Universities; and Senator Stanford's munificent gift is the indorsement of one of our most practical and successful business men. There are some that feign to laugh at what they call the "bread and butter" education, but better a discovery for killing pests than a new accent in Greek; better acrobats, gymnasts and stout baseball players than white-handed, pale young men, reciting whole pages of Horace and unable to earn the salt that goes into their mush.

The History of Iron.

Dr. Andree, of Leipsic, according to *Nature*, discussed before a recent meeting of the Anthropological Society of Vienna whether iron was known in America in pre-Columbian times. Meteoric iron was certainly in use among certain tribes and the Esquimaux, but Dr. Andree thinks that they were wholly unacquainted with the art of forging iron. This conclusion is based on the fact, among others, that while there is ample proof that the Indians (the author under this term including the Mexicans and Peruvians) knew how to obtain and employ gold, silver, tin, copper, quicksilver, etc., we hear nothing of iron mines in the history of the civilization of ancient America. The language itself proves this, for there is no expression for iron. Some writers, it is true, speak of the word panigue as that for iron, but it really means metal in general. Moreover, in prehistoric, or pre-Columbian graves, especially in the rainless regions of Peru and Northern Chili, ornaments of all kinds, weapons and implements are found; but no objects in iron have been discovered, although the Indians placed their most valued articles in their tombs. (Meteoric iron has, however, been found in several mounds in Ohio, by Mr. F. W. Putnam, of the Peabody Museum in Cambridge, both in a natural state and hammered; in the latter form used for the same purpose as native copper, both for implements and ornaments.) Dr. Andree thinks there is no reason to believe that the tools employed in the great masonry work of Peru, such as that at Tiahuanaco, were other than those in use of the rest of Peru, which were the chisels, a species of bronze. The chisels found in Peruvian graves soon become blunted when used on the hard strut; but it is suggested that there was some method of sharpening them easily. Indians have certainly worked a hard stone like nephrite without iron; and there is no improbability, says the writer, in the theory that these chisels were employed.

than the evolution of States and the problem of governments. It is true, they became familiar with the thoughts of Plato and Xenophon, Homer and Sophocles—noble, beautiful thoughts they are, too, but the thoughts of men who lived thousands of years ago, and in times very different from ours. Much time was spent in learning the angles of refraction of the different colored rays, but very little devoted to the handling of microscopes or telescopes in search of objects. They were taught the lines and curve in which the great orbs moved under the combined impulse of repellent and attractive forces, but the knowledge of the geologic growth of the great globe on which they lived, its races of animals, plants and men, was crowded into a corner. The whole system was too far away in space and time to be of any practical use. Under the old system, geometry, trigonometry, mechanics and physics are about the only things of real practical value, and in these branches more time is given to the theoretical and abstract than to the really useful. The whole scheme seemed to be devised to keep the student as far away as possible from all contact with the great actual world.

Nor is this state of things likely to change for the better. There has been a deal of talk but little done, or likely to be done inside the old establishments. It is hard to get out of ruts, and it is just about as difficult to recast a cur-



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SAN FRANCISCO:

Saturday Morning, June 11, 1887.

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Passing Events.

Earthquake shocks have again occurred in Arizona and have extended up into the eastern portion of California and Nevada. They were not attended with any loss of life or damage to property. A new volcano is reported as having been found in Sonora, Mexico.

Another astronomical observatory is to be established in this State, this time somewhere in the San Bernardino mountains. Ex-Mayor Spence, of Los Angeles, has given \$50,000 to the University of Southern California for this purpose.

By next week the first electric railroad in this city will be operated for a short distance on Folsom street. Franchises for several electric roads have been granted in other California cities of late.

It is generally recognized that California is entering on a period of prosperity such as it never experienced before. Thousands of people are settling in the State, and new towns are springing up in all directions. The immigration this year will be larger than ever before.

SAN LUIS CHROME.—The San Luis Obispo Tribune says: Mr. Jack, agent for Kalion & Co., of Philadelphia, who are taking out chrome ore in this section, took advantage of the reduction in rates to ship 27 carloads to San Francisco the fore part of the week. This lot cleans up every pound on hand, and unless the market brightens up no more will be mined. We also understand that land-jumpers are causing the company considerable trouble.

Much-Needed Reforms.

We have it on good authority that a certain mining operator formerly of this city, now a resident of New York, has been sued by Eastern parties for a million dollars, being the amount paid him for shares or interests in properties guaranteed by the vender. The present is a civil suit, but, should the defendant, in the event of a judgment being obtained against him, fail to satisfy the same, then the complainants will, it is said, proceed against him in a criminal action. Whether or not the grievances complained of are in this particular case well founded, we are not advised. That more suits have not, however, been instituted against this class of offenders is matter for surprise, seeing how numerous they have in these later years become.

It looks as if no condition or station in life is able to lift men above the temptation to take undue advantage of those with whom they have dealings. Reputation, wealth, title, nothing restrains them from having recourse to sharp practices and even downright fraud for accomplishing their selfish ends. Affluence seems to only whet the appetite for illegitimate gains, and honesty and honor to have become extinct virtues with the human race. To gain admission to the ranks of the plutocracy has become the highest ambition of our kind. Irresponsible adventurers swarm in every field of enterprise! Sharpers, middlemen and promoters crowd the avenues of every industry, more than half the legitimate business of the world having resolved itself into absolute gambling. Even the nobility of England, with all their boasted pride of character, are not above seeking to make money through the sale of their influence and position. In lieu of shares donated them, many of this class will accept the place of directors in any bogus scheme about to be floated on the London market.

And so in all countries and throughout all ranks of society, wherever we look there is seen this same inordinate greed and shameful prostitution of every manly instinct and principle to money-getting. Friendship, fidelity, truth, trust, everything honorable and sacred is sacrificed to this Moloch of avarice.

We are not moralizing but merely making a statement of facts, in the hope that there may be worked some abatement of this all-prevailing crookedness, through the development of a more healthy public sentiment, or through the enactment of more stringent laws adapted to that end, if needs be.

In so far as the mining industry is concerned, we are free to admit there is much that calls for reform. To begin with, let it be insisted that experts and mine-viewers of every kind be held to a more strict accountability, both as regards matters of fact and matters of opinion, than has heretofore been the custom. Any fraudulent act, or even gross blunder, on the part of an expert ought to be considered proof of such unfitness as should debar him from being further employed in such capacity. Companies should be made responsible for every statement contained in any report, circular or prospectus issued by them. So, also, should the mine-owner be bound by all representations made by himself or his agent touching the value of his property. The mine-owner who aalts his claim or misrepresents it in any essential particular ought to be treated as a swindler. Directors who declare dividends that they have not earned, or who earn dividends by gonging out the richer portion of their mines, who levy assessments for their own benefit or for the purpose of freezing out weak shareholders, are simply knaves and ought to be treated as such. What are these acts but conspiracies to cheat and defraud? What is this whole business but obtaining money under false pretenses? Just that, and nothing else. They are crimes, and these smart people are criminals. In saying this we are not expressing a mere individual opinion; we voice the sentiment of all right-thinking men. Nor are we giving utterance to any sudden or new-born impulse. The PRESS has always inveighed against this entire brood of evils, and now only renews its oft repeated protest against their longer continuance. We hope to see the business of mining purged of these abuses before, through long standing, they become chronic and all but incurable. If this purgation shall meantime be extended to such other industries as they in like manner pervade, so much the better.

Cost of Producing Copper.

The wonderfully large increase in copper production in the United States in the past few years has had the effect of cheapening the metal in the markets of the world. When the Montana and Arizona production was added to that of the Lake Superior mines, we produced in this country largely beyond our needs. Still the rate of increase of consumption in the United States is increasing. The principal consumers here give figures which indicate a rate of increase of 16 per cent of 1885 over 1884, and the figures only indicate a part of the consumption. When statistics of copper production were first kept, as far back as 1845, the whole United States only produced 112 tons a year. Now our total production is 74,000 long tons per annum.

The question of cost of production, now that prices are low, is one of interest. At Lake Superior, where the principal mines are, the following records are available:

Mines.	1885.	1884.	1883.
Quincy.....	7.50	8.63	9.00
Osceola.....	10.90	11.24	12.21
Atlantic.....	9.37	10.83	12.56
Central.....	8.83	15.10	15.40
Allouez.....	11.29	13.46	15.98
Franklin.....	10.03	11.62	12.96
Huron.....	11.75	14.78	

The percentage of yield of same mines during same years was as follows:

Mines.	1885.	1884.	1883.
Quincy.....	2.51	2.70	2.86
Osceola.....	1.17	1.21	
Atlantic.....	.74	.76	.68
Central.....	.37	.243	1.90
Allouez.....	.84	.85	1.86
Franklin.....	1.146	1.45	1.38
Huron.....	1.18	1.45	

The cost of production at the Lake Superior mines for 1886 is given as follows:

	Cents per lb.
Quincy.....	6.78
Osceola.....	8.67
Franklin.....	9.34
Atlantic.....	9.63
Tamarack.....	7.49

That of the Calumet and Hecla is not published, but it is believed to be lower than that of any of the others, the rock being nearly twice as rich. These figures include cost of smelting, freight to and charges in New York.

The percentage of copper in the rock treated and the total production during 1886 was as follows:

	Per-centage.	Tons.
Quincy.....	2.54	2,967
Osceola.....	1.89	1,780
Franklin.....	1.88	2,132
Atlantic.....	0.71	1,752
Tamarack.....	2.74	1,832
Calumet and Hecla.....	—	25,259

From this it appears that the leading mines, with a production of about 35,700 tons, can live at about 10 cents per pound for their copper (say £47 10s. per ton, with 2½% discount), while three mines—the Quincy, Tamarack, and Calumet and Hecla—with a production of about 30,000 tons, which is likely to be considerably increased this year, can do so at 7½ cents per pound (£35 12s. 6d. per ton).

With regard to the Montana mines, no information as to the cost of production is made public. At the present time, however, all the different concentrators and smelters are running at full force, with the exception of those of two companies. These, it is estimated, are now producing at the rate of fully 3500 tons of fine copper per month.

James Lewis & Sons, the Liverpool ore and metal firm, speak in their report as follows concerning this subject: With lake copper selling at 10 cents per pound, the value of the copper in Montana matte, after allowing 1½ cents for cost of smelting and 1½ cents for difference in quality, is, in New York, not more than 7 cents per pound; and as the railroad freight from Montana to New York represents 1½ cents per pound of copper, the net proceeds cannot be more than 5½ cents per pound. Whether those mines whose ore does not contain silver of value and only contains 7 or 8% of copper, necessitating concentration and smelting into matte before shipment, can live at this figure seems very doubtful. A reduction in the rate of railroad freights from Montana to Chicago, by both the Northern and Union Pacific roads, of 20%, is, however, shortly expected to be made.

That £39 5s. for Chili bars or £44 per ton for best selected copper in Birmingham leaves little profit to the large Spanish mining companies as shown by the dividends recently declared by Mason and Barry of 2½% for 1886, against 3½% in 1885; the Rio Tinto Co. of 3% for 1886, against 5½% in 1885; Tharsis Co. of 7½% for 1886, against 10% in 1885. Chili bars being

£40 10s. for 1886, against £44 in 1885. The Panulcillo Co. of Chili, which smelted 2193 tons of fine copper last year, has paid no dividend. A small dividend has, however, been declared by the Mansfield Co. of Germany for 1886.

Gleaning the Gold Fields.

They who gathered the first crop of gold from the California placers did their work in such a hasty and wasteful manner that much of the crop was left behind, this waste having been due not more to such haste than to the imperfect methods and appliances wherewith the work was done. The aim of the pioneer miner was to wash as much dirt as possible, to which end great quantities of water were used in machines set at high angles, little or no quicksilver having been employed at first. Operating under these conditions, nearly all of the extremely fine gold passing off with the tailings was lost, and even much of the tolerably coarse went the same way.

As those first in the field washed the auriferous earth in a hurried and careless way, so also did they leave a good deal of the poorer ground unworked, as it would not pay what in those days was considered miners' wages. Between the ground so left and the secondary deposits formed by the rich tailings, a large population has during all these years found material on which to prosecute the business of placer mining in its more ample and inexpensive forms, these operations being outside the quartz, drift and hydraulic workings. There are in this State, Chinese included, between 8000 and 10,000 men engaged in river-bed operations, working over bars, gulches and tailings, ground-sluicing and other kinds of surface-mining. The most of these operations are intermittent, some being carried on only in the summer, and others only in the winter; but these men generally earn good wages for the time they are at work. For the successful prosecution of these branches of mining not much capital is required, hence their attraction to men of small means.

Even though it undergo no enlargement, this province of mining will for a long time afford, as it now does, profitable employment for a great many men. But there is a probability that it will, in some of its departments, be extended. Should hydraulic operations come to be actively resumed, the tailing deposits, already largely accumulated in the beds of the rivers and canyons, would be further increased, adding to the material that will some day have to undergo a rehandling. With the improvements made for recovering the gold from the auriferous beach sands it may be expected that this branch of mining will be reinstated and greatly extended, as these deposits are almost without limit, and have as yet only been skimmed of their cream, so to speak. Then, we have in California a vast area of what are known as dry diggings, being shallow placers where water is so scant that the dirt has to be manipulated by the process called dry washing. Here again, the methods for handling this class of deposits hitherto in use have been so improved upon that we may count upon the latter being extensively utilized in the early future. Aside from our quartz, drift, and hydraulic mines, we have in these partially exhausted placers and other surface deposits resources that will suffice to give California prominence as a gold-producing country for a century to come. Our gleaners gather more than the harvesters in most other gold fields of the world, and our stuhle ground is extensive, with the possibility of its undergoing much expansion.

At the meeting of the Trustees of the Mechanics' Institute, a communication was read from H. G. Hanks, who offered his services to take charge of a special department of mineral exhibits from the Pacific Coast. He had offered his services to the Citizens' Committee, but with what result the latter was silent. Mr. Hanks' letter was referred to the Committee on Special Exhibits.

AN Oregon paper says that smelting works to cost \$50,000 are to be erected at Tacoma, W. T., and will be the only institution of the kind on the Pacific Coast outside of San Francisco.

PORTLAND, OREGON, capitalists are about to develop the quartz and placer mines 90 miles east of Ensenada, Lower California. New machinery will soon be shipped.

Blasting Rock.

The Knox Rock Blasting Company, of Alleghany, Pa., are owners of a patent method of blasting rock, which will interest miners and quarrymen on this coast. The method is to form open ends in quarries having any one of the following characteristics: First, where there is a solid ledge of rock extending indefinitely in two directions from this spot to be opened; second, where the aforesaid ledge is of too great depth to be worked in a single bench, and is massive or without open lines of stratification; third, where in either of the above cases it is necessary that the vertical cut shall not extend beyond the outlines of the block detached; fourth, where there is a "hang" of rock extending indefinitely in two directions.

The invention consists in blasting the rock in predetermined straight lines, and in charging with reference to the character of the rock, in such a manner as to take advantage of its elasticity.

In the opening of quarries having the hitherto-mentioned characteristics, one of two courses is now pursued, viz.: either the rock is channeled with a channeling machine and the ends thus formed worked from, or a blast hole is sunk to a considerable depth, a large amount of powder placed therein, and the charge tamped and fired. In the first case this work is slow, costly machinery is required, and a large number of workmen necessary. In the second case an irregular hole results, an immense amount of stone is rendered worthless, and the surrounding rock is damaged by rents to a greater or less extent. By this method we are describing the rock is split into rectangular-sided blocks from the beginning, and no waste incurred, the time for opening the quarry greatly lessened, and all the labor necessary performed by three men.

In practice the inventor forms the blast-holes first in the ordinary manner. He then reams out oppositely-located grooves in the side of said hole, care being taken that the apices of these grooves are in alignment with each other and with the cut to be made. The holes are then charged, reference being had to the character and elasticity of the rock.

In Fig. 1 of the accompanying drawings is shown a ledge having indefinite longitudinal extension, and not too great depth to be worked in a single bench. *A* is the top and *B* is the face of the ledge, and *C* is the block to be removed. The operator first inserts in the top of the ledge a hole, *a*, whose grooves are so placed that a line joining their apices will form a slightly acute angle, with the face, *B*, on the side next the block, *C*. This hole is then charged, tamped, and fired. The result will be a cut in the direction of the dotted lines extending downwardly through the rock, forwardly to the face, *B*, and rearwardly to a distance varying with circumstances. Immediately upon the charge being fired the sides of the cleft come together, and the crack is imperceptible. The elasticity of the rock is always sufficient to allow the cut to be made, even when said cut fails to reach the face of the rock. Next a second hole, *b*, is made at some distance from the first, and its grooves formed so that a line joining their apices will form an acute angle with the face of the rock on the side next the block, *C*. This hole is then charged, tamped, and fired, resulting in a cut in the direction of the dotted lines. Finally, a third hole, *c*, is made, midway between the cuts first made and its grooves, formed so that a line joining their apices will be parallel with the face, *B*, of the ledge. This hole is then charged and fired, resulting in a cut in the direction of the dotted lines, said cut joining the two former cuts at obtuse angles. There is now a block, *C*, separated from the main body of the rock, widest at the front, and gradually narrowing toward the rear. This block may be divided or worked out in any well-known manner. The bench is then worked out from the two ends, *D E*, the vertical cuts being all made at right angles to the face. Thus all blocks after the first three are perfectly rectangular.

In Fig. 2 is shown a ledge of rock similar in all respects to that in Fig. 1, except that the rock is of too great depth to be worked in a single bench. In this case it becomes necessary to form a false bed before the block *C* can be cut out. The operator therefore first sinks a horizontal hole, *d*, in the face *B* of the rock, at such a distance from the top as may be desired for the bed. The grooves are formed in such a manner as that a line joining their apices may be parallel with the top of the ledges. This hole is then charged and fired, resulting in a cut parallel with the top of the ledges in either direction proportioned to the charge. The block *C* is then cut out in the manner already described, and the ends *D E* worked to the extremities of the false bed. A shot similar to the first is then made to continue the false bed, and so on until the end of the ledge is reached, if desired. Sometimes it is necessary to avoid the back cuts, *f g*, in forming the block *C*. In such case (see Fig. 3) the holes *a b* are placed equidistant from the front and back lines of said block, the hole *c* equidistant from both sides, and the side holes and back hole equidistant from the back corners of the block. The three holes are then charged, tamped, and simultaneously fired by means of electricity. This cuts thus produced simultaneously reach the points of intersection, intercept each other and the gases escape or are condensed before the cuts can be prolonged. Thus a block is disengaged from the body of the ledge without splitting or marring the surrounding rock.

In Fig. 4 is shown a hang of rock, in which it is desired to work. A hole is first bored midway between the two sides of the neck, and the groove made to extend therein, so that a

FIG. 1

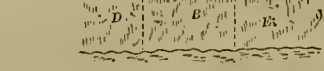


FIG. 2



FIG. 3

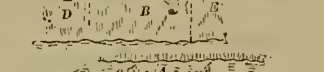


FIG. 4



Method of Blasting Rocks.

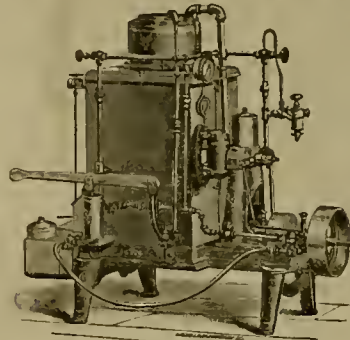
line joining their apices will extend (with a slight diagonal deflection) transversely across the hang. This hole is then charged and fired, and a cut is made which extends entirely across the hang. A second hole is then inserted near the first, whose grooves are so formed as that a line joining their apices has a slight diagonal deflection in the direction opposite to the first. This hole is then charged, tamped and fired, and the result is that a wedge-shaped block is disengaged from the surrounding mass. This may be worked out in any desirable manner, and there remains the two ends from which to work.

It will be seen that the success of all the shots is dependent entirely upon the elasticity of the rock. By making the force of the powder expend itself in right lines, and employing comparatively small charges, cuts are made in the solid faces of the rock, which need not necessarily extend to the surface in either direction. The rock simply opens momentarily and then closes. By combining these "blind" cuts with ordinary open cuts, i. e., where the rock is free on two or more sides, the inventor claims that he is enabled to open and work any imaginable character of quarry without the loss of any material, without throwing fragments, and thereby endangering lives, and with scarcely perceptible noise. The charges are necessarily dependent on the elasticity of the particular rock, and must be properly proportioned thereto. Such a charge as might work in one rock with the greatest success, in another might have little or no effect, and in a third might overdo the work required of it and shatter the rock. This matter can only be settled by actual experiment with each character of stone.

NEWS has been received from Santa Rosalia, Mexico, that the large copper reduction works of the Compagnie Bolo, situated at that place, were partly consumed by fire two weeks ago. The loss is over half a million dollars.

The Shipman Automatic Engine.

The Shipman engine, shown in the engraving on this page, has been widely introduced to meet the demand for a small motor, and so far as we have heard has given full satisfaction in work to which it is adapted. It is in small compass and yet capable of standing high pressure and doing effective work. It runs with kerosene or fuel oil, consequently is cleanly and the fuel is easily provided. It is portable and can be carried by two persons to any desired point.



The Shipman Engine.

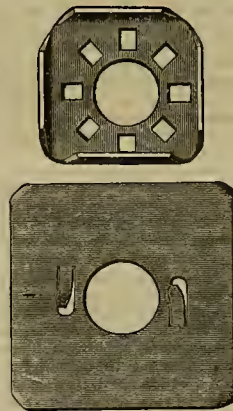
The engraving shows the latest improved form, and will give the reader a general idea of its appearance. It can be seen in operation in the Post street end of the well-appointed stores of Oshorn & Alexander of this city, who are the agents for the Pacific Coast.

The uses to which the Shipman engine can be put are beyond enumeration. For running printing presses, it is widely employed. For grinding apples for cider, sawing wood, cutting sorghum, grinding and shelling corn, pumping water, propelling yachts and steam launches, and for nearly all imaginable uses, it has already made a good record. Further information concerning the machines can be had by addressing Oshorn & Alexander, 623 Market street, S. F.

Hay's Nut Lock.

Loose nuts on vehicles, machines, and in fact anything where nuts are used, are a constant source of annoyance; but on thrashing, harvesting and other farm machinery they are worse than elsewhere. This kind of mechanism is subject to all sorts of movements, and nuts are apt to get loose and cause delay and damage.

We give an illustration on this page of a new form of nut lock invented by John Hay, of Elmira, Solano county, who is at present at



Hay's Nut Lock.

426 Kearny street, San Francisco. This nut lock was specially devised to meet the requirements of thrashing machinery.

As will be seen from the cut, it is very simple in construction, but effective. The pawl-plate is set down over the bolt. Then the nut is dropped into the slotted flange washer and screwed down. The corner points of the plate sink slightly into the wood, allowing the plate to bend a little, forming a spring that allows for shrinkage of the timber.

In unlatching, the corners of the plate are raised slightly and the point of a nail or any handy thing placed under the corner, and the whole thing is then turned back. The little pawls in the pawl-plate fit in the slots of the flange in which the nut sets. If there is a strong pressure, the pawls go in between the slots in the plate and the nut cannot get loose. The nut is securely locked and cannot jar back or turn in any way unless a wrench is used. These nut locks have been used by

the C. P. R. R. Co. for five or six months past, and no wrench has been used upon them since. The Shipman harvesters are now supplied with these nut locks, which have been found very efficient. Different sizes are made for different bolts. The simplicity and effectiveness of the device is readily recognized by all who examine it. These nut locks may be seen at Trueman, Isham & Hooker's, or Henry Boll's, in this city.

Astronomical Observatories.

E. F. Spence, ex-Mayor of Los Angeles, and President of the First National Bank of that city, has given a check for \$50,000 to President Bovard, of the University of Southern California, to establish an astronomical observatory. It will be known as the Spence Observatory, and will be eventually thoroughly equipped. Mr. Bovard thinks he will be able to raise \$150,000 more in order to carry out the plans of the founder.

The State will soon be well supplied with astronomical observatories. The largest refracting telescope in the world will shortly be ready for use at the Lick Observatory on Mount Hamilton. The University of California has a telescope of its own, and there are several private observatories in Oakland. The Chahot Observatory, in that city, given to the public schools of Oakland by A. Chahot, is in constant use, and is well equipped. Two astronomers are employed, who are on duty every evening, and any one may visit the observatory on application to the Superintendent of Schools. The Davidson Observatory, in this city, belonging to Prof. Geo. Davidson, of the U. S. Coast and Geodetic Survey, is a very useful institution, and is constantly utilized.

Of course our greatest observatory will be the Lick, for which \$700,000 was given by the man whose name it bears. Its equipment has been so elaborate and expensive, however, that it is now feared the income from the remaining fund will be too small to maintain it with the proper force of astronomers and assistants. The Regents of the University of California are now considering the question of their authority to give \$11,000 per annum from the general University fund toward its maintenance. It is to be hoped that some arrangement will be made so that Prof. Holden and his assistants will be able to carry on their work properly. A mere "show" observatory is of little utility, and when such an immense sum has been expended in magnificent instruments, work should be done and results published.

Grass Valley.

Malville Attwood, who has been for a few weeks at Grass Valley in the interest of the State Mining Bureau, returned this week. He says the place has become a veritable garden spot, the result of the liberal introduction of water. Mr. Attwood resided at Grass Valley early in the "fifties," being one of the pioneer miners. The town has become very beautiful. Every home has its grass plot, flowers and fruit trees. He speaks highly of the enterprise of the Coleman Brothers, to whom the town is much indebted in many ways. The introduction of water is due to them, as also the presence of the railroad. They also have been the developers of the best mine in the district, and, in fact, in the State. From one ore shoot in the Idaho, upward of \$14,000,000 have been taken. At the bottom of the shoot, 1600 feet, the ore looks as well as ever.

William Bourns and John Hays Hammond have put up two model mills at Grass Valley—the North Star and Empire—and both are working well. Grass Valley is decidedly the center of quartz mining in California. The Idaho, Empire and North Star mines have all attained good depths and are doing well. It is a significant fact that the deepest gold mines in the State are paying the best. The arrangement of the two gold-mills put up under Mr. Hammond's supervision are very perfect, and the mills are the best yet built on the coast.

Mr. Attwood has been underground in the more important mines and made investigations, the result of which will be published in the report of the State Mineralogist.

ABOUT 60 men are kept constantly at the Great Eastern quicksilver mine in Guerneville—no Chinese. The average daily shipment of quicksilver is about 15 flasks.

MECHANICAL PROGRESS.

Mechanical Wiseacres.

At regular and frequent intervals some mechanical wiseacre makes, in his imagination, the alarming discovery that there is a constant falling off in mechanical skill; that mechanics 30 years ago were much more competent than they are to-day, and that in this respect things are getting altogether bad. There is never an atom of evidence going to show that there is any truth in this statement, but a good many well-meaning men believe it, and proceed to set up ingenious theories to account for the assumed fact. Of all statements that receive almost universal credence, this is by odds the most stupid. The *American Machinist* discourses upon this subject as follows: Thirty years ago it was comparatively rare to find mechanics who knew more about the trades they followed than was required to enable them to use the tools they worked with. When there was one who studied beyond this he stood out phenomenally, by contrast. At the present time all mechanics study literature relating to their trades, and many of them are close students of the principles of mechanics.

But methods have been changed in 30 years, and a good deal of work that was done then by skilled workmen is now done by those who do not pretend, or at least more than pretend, to be mechanics. Machinery which requires only the attention of a small amount of special skill is made to do much of the drudgery formerly done by the mechanic, hence it is common to find a good many men working in the trades but not at the trades. These are ranked by the superficial thinker as mechanics, and compared with those of the "old times." The mechanic of to-day who has learned his trade is, as he should be with the advantages of better facilities and immensely better opportunities for reading and studying in the proper direction, much better able to follow it intelligently than he could have been 30 years ago.

It would be just as reasonable and quite as correct to argue that business men were less proficient now than formerly, because they have come to make use of specialists in various departments of business—men who make no pretensions to an understanding of more than the particular part they do. But no one would believe this.

Akin to the wiseacre who sees ruin in the waning abilities of the mechanic, is the one who, seeing things quite differently, but equally falsely, evolves the conclusion that machinery has done away with the need of skilled mechanics. Skill of a high order was never more in demand, and it will never come in any trade where machinery can do away with the necessity for it.

As we have at different times pointed out, there is danger that a disinclination on the part of manufacturers to take apprentices may make the supply of the right kind of mechanics scarce, but then the demand for them will be still greater. In any event, they will be more skillful year by year as long as the world continues to grow wiser.

The Bursting of Carriage Tires.

T. J. Flowers, writing to the *Hub*, says:

The bursting of tires is an annoyance that carriage-makers often have to contend with, and the workman is sometimes censured for accidents of this character for which he is by no means responsible. True, poor iron and an imperfect weld may sometimes be the cause, but there are many other and equally common causes over which the mechanic has no control, such as the forces of expansion, contraction and crystallization. These forces are also affected by the elements, over which we have no control. Every tire on every wheel is continually subjected to one or the other of these forces, and sometimes to all combined, with the addition also of percussion. To illustrate, let us consider a tire $1\frac{1}{2} \times \frac{1}{2}$ inch, on a wheel 4 feet in height, and hear in mind that a bar of iron $1\frac{1}{2} \times \frac{1}{2}$ inch is only capable of resisting about 29,868 pounds average tensile strain. Now, when we put a tire on a wheel we give it what is called "draft," or make it smaller than the circumference of the wheel, and thereby give a tension of at least 30° of heat, which is equal to about 4480 pounds tensile strain with the mercury standing at 86° F. Now, suppose it to drop to 23°, or 9° below freezing point, and we have 63° of contraction, which is equal to 8960 pounds, or 4 tons, more tensile strain. Besides this, the iron has lost by cold at least 900 pounds of its original strength, which leaves only 15,528 pounds to resist the force of percussion and the expansion of the rim by frost.

Again, the iron is weakened by bending, and we can learn how much by ascertaining how much its tensile strength has thereby been taxed. We have said that the wheel is 4 feet in diameter, and consequently it will take a bar of iron 12 feet 6 13 16 inches long to hoop it, not allowing for the weld. Now, when this bar is bent to form the tire, the outside diameter is increased 1 inch in consequence of the thickness of the bar, and its circumference is increased over $3\frac{1}{2}$ inches. How are we to account for this increase of length? Has the outside stretched? Yes, for the crushing and drawing forces used in bending were equal, and therefore the outside must have stretched at least $1\frac{1}{2}$ inches, and thereby weakened the iron one-half its original strength, leaving but about

1590 pounds to resist the force of percussion and the expansion of the rim by frost, the latter force being alone sufficient to overcome that amount if it were not that a wheel is a yielding body.

DRY ROT IN TIMBER.—In a recent number of a German technical paper, Herr Gottgetreu treats of the question of dry rot by the light of a summary of known facts illustrative of the subject. He is of opinion that the problem is still to be solved, and, in view of the occurrence of dry rot under some very peculiar conditions, suggests that the germs of the disease may exist in the living tree. In no other way can he explain the decay of wood from this cause, when it was apparently dry and sound and properly used. In Russia there are entire forests from which the timber is taken, experience having shown that it has always been attacked by dry rot. Sometimes a strong solution of common salt, applied while hot, has been found an efficient preservative of timber. The necessity of airing timber in its built-in position is, of course, universally recognized. Professor Farsky, of Terhor, Bohemia, has found that salicylic acid is a preventive and cure for dry rot. At first the acid was used in a dry form, but latterly great success has been achieved with a solution of 5.28 ounces of salicylic acid in 0.22 gallon of alcohol, and afterward diluted. This solution has efficiently protected a floor 800 square feet in area from the spread of dry rot, and has removed it from the spots where it seemed to have established itself. The crystals of acid may be used for this purpose, and its action as an antiseptic is heightened by the admixture of a little carbolic acid. Professor Poleck finds that wood cut in winter and not soaked in water is very susceptible to dry rot, which does not appear when the timber is kept perfectly dry or thoroughly wet. A somewhat high temperature and dampness are almost, though not entirely, essential to the propagation of dry rot mycelium. It is in contemplation to determine by experiment whether timber cut in summer cannot be rendered safe against dry rot by the removal of the bark, protracted drying and prolonged steeping in water.

JAPANESE SKILL.—With all its boasted excellence in manufactures, the Western World has still something to learn from the East. Neither Sheffield nor Birmingham, with all their skill, is able to turn out a sword-blade which can begin to compare with the wonderful sabers of Japan. For fineness of temper and keenness of edge they are unequalled in the modern world, and can scarcely be matched by the blades formerly forged in Damascus and Toledo. A common feat for a Japanese soldier is to cut a pig in two at a single blow; and I have seen hars of lead, and even of iron, divided by these weapons without a notch or imperfection being visible on the blade. While not possessing the marvelous dexterity of the Sikh swordsman, the Japanese would be most formidable adversaries in hand-to-hand fighting. On the occasion of the murder of Richardson and his party—a fate which, by the way, they brought on themselves—a horse's hind leg was completely severed from the body by a stroke from one of the terrible two-handed swords. A sword of superior excellence is preserved as an heirloom in the Setsuma family, and with this blade I have seen a leaf floating on the stream cut in two by merely being allowed to drift against the edge. The Japanese understand the tempering of sword-blades better than any other people, and all the efforts made by the British Government a short time ago to produce as fine an article failed utterly.—*Toledo Cor. Globe-Democrat.*

INVENTIONS WANTED.—An English journal enumerates the following as among the inventions which are specially needed at the present time: Macaroni machinery, good red lead pencils, type-writers that will work on account-books and record-books, indelible stamp-canceling ink, a practical car starter, a good railway car ventilator, better horseshoes, locomotive headlights, an instrument for measuring the velocity of wind currents, apparatus for measuring the depth of the sea without sounding by line, piano-lid hinge which shall be flush on the outside, good fluid India ink for draughtsmen, a good metallic railway tie, an effective cut-off for locomotives, a method of alloying copper and iron, and a molding material for iron and brass casting, capable of giving a mold that can be used over and over again.

UTILIZING THE HEAT OF SLAG.—Mr. Brotherton, superintendent of the American smelter, at Leadville, Col., has patented a plan for generating steam for motive power at the smelter, through the use of slag. By this method the slag is dumped into large shallow vessels, which are afterward run under boilers, and the heat used in generating steam. An experimental test of the method resulted in maintaining 75 pounds pressure on a vertical boiler for seven days. If the plan proves practical, it will result in a saving to the smelter of \$1500 a month.

REPAIRING A STEAM PIPE.—The *Mechanical News* describes an ingenious means of repairing a break in a steam pipe: The break is bound with wood strips, laid close together, and well served around with stout cord or rope. Endwise separation is prevented by more rope crossing the break diagonally, and tied so as to draw the broken parts together. When the wood and the cord get wet with the steam, the joint is even tighter than before, for the wood swells and the cords shorten.

SCIENTIFIC PROGRESS.

PURIFICATION OF WATER BY MOTION.—A discovery has been made by Dr. Pehl, of St. Petersburg, which promises to have a very important bearing on many industrial processes. The water of the river Neva is very free from bacteria, having only about 300 germs in a cubic centimeter. The canals of St. Petersburg, on the contrary, are infected with bacteria, their number reaching 110,000 in a cubic centimeter, even during good weather. The same is true with regard to the conduits of water for the supply of the city. While the chemical composition of the water passing through these city conduits hardly differs from that of the Neva (by which they are supplied), the number of bacteria reached 70,000 against 300 in the water freely taken from the river; and the worst water was found in the chief conduit, although all details of its construction are the same as in the secondary conduits. Dr. Pehl explains this anomaly by the rapidity of this motion of the water, and he has made direct experiments in order to ascertain that. In fact, when water was brought into rapid motion for an hour, by means of the centrifugal machine, the number of developing germs was reduced by 90 per cent. Further experiments will show if this destruction of germs is due to the motion of the mass of water or to molecular motion. If this discovery of Dr. Pehl's be confirmed, it will become possible to destroy bacteria and render a water comparatively pure, simply by passing it through a centrifugal machine. The subject is of special interest to brewers, who suffer, perhaps, more than any other manufacturers, from the attacks of bacteria.

EXPERIMENTS WITH STATIC ELECTRICITY.—According to the *London Electrician*, the following interesting experiments were described by Mr. Boys at a recent meeting of the Physical Society: "If sealing wax or any similar sticky substance be melted in a cup and put upon the conductor of an electrical machine, as in one of the old-fashioned experiments, it will begin to throw out threads in an extraordinary way; the fibers are large when the resinous matter is very hot, and each fiber shoots out as a cylinder with remarkable speed, then breaks into beads. These minute beads can be made to patter against a drumhead, and make a noise upon it like falling rain. The cup containing the melted wax should be inclined from the operator, and from the electrical machine before the latter is worked, or be covered with the most invisible sticky web imaginable. A cup of burnt india-rubber tubing so treated sends out almost invisible filaments. Canada balsam is the perfection of a material for producing sticky threads. When a candle is held near a cup throwing out such electrical filaments, they shoot into the flame and sometimes cover the candle; sometimes they will stop as they approach the flame, then turn back and go into the cup from which they started, in consequence of discharging their electricity into the flame. In a few minutes, miles of these sticky threads can be made, and, as they break into beads, the method affords a ready means of powdering such of these substances as are not easily pulverized in any ordinary way."

HOW OIL STILL THE WAVES.—Any seaman having a doubt as to the efficacy of oil in stilling heavy ocean waves should read the article on this subject in the *Forum* for November of last year, written by Professor Thurston. He touches the philosophy of the matter by saying that "when a drop of oil is placed upon the surface of water it first rapidly spreads in all directions, forming a film of exceeding tenuity," and its effect upon the sea surface is "as if a sheet of carpet of a thin, flexible, elastic and yet tenacious substance, like rubber, had been spread over the waves." This effect is largely due to the fact that the breaking of waves is facilitated by large surface tension and small viscosity of the water, while small tension and great viscosity hinder this breaking, especially when combined with considerable tenacity of the surface molecules. As Professor Thurston shows, oil on the water forms a new surface having great superficial tenacity and small surface tension. For this reason it reduces the liability to surf, and when poured on the water in a fine, trickling stream reduces to smoothness or to unbroken rollers what was before a frightful mass of breakers.

INTERESTING REPORTED DISCOVERIES.—A New York press telegram from Meadville, Pa., May 6th, says: Dr. C. C. Carroll, of this city, after years of experimenting, has discovered a method by which aluminum can be cast, soldered and welded. It is claimed by metallurgists and artisans that this is a very valuable invention, since it incurs the use of aluminum for many purposes on account of its extreme lightness, strength, and non-oxidation by exposure. It is already successfully employed in the manufacture of dental plates, for which it is apparently admirably adapted. In the course of his experimenting, Dr. Carroll believes he has also discovered the law governing the disintegration of iron structures employed in the construction of bridges.

GLOW LAMPS.—At one of the recent meetings of the British Society of Arts, Major General C. E. Webber read a paper on glow lamps, in which he gave the results of his observations as to the best method of arranging them. He

said that as the surface of the filament is so much smaller than that of a gas flame, its brilliancy, when giving an equal light, is such that it produces sudden slight paralysis of the receptive powers of the eye. The result is that persons often complain of the want of light in a room fitted with glow lamps, although the illumination is actually greater than it would be with gas. The remedy for this is that glow lamps should be invariably shaded from the eye, and he placed as near as possible to the object to be seen. General Webber also described the manufacture of glow lamps, mentioning incidentally that the filament of the Victoria Brush lamp is made by squirting a viscous solution of cellulose into a precipitating solution, a process which produces this most perfect uniformity of section.

THE DISCOLORATION OF PAPER.—According to experiments made by Professor Wiesner, of Vienna, rapid discoloration is only noticed in paper made from wood pulp, and must be clearly distinguished from the discoloration of old, good rag paper. Wood-pulp paper, when exposed to the almost perpendicular rays of the sun, showed the beginning of discoloration within an hour. No change, however, was noticed while the paper remained in the dark, even with the increase of temperature caused by the sun's rays, and it was naturally concluded that only the light is instrumental in the discoloration of wood-pulp paper. Further experiments proved that the discoloration of wood paper is a process of oxidation dependent upon the light; also that, while dampness is favorable to discoloration, it is not a necessary element of the process. The power of the light is important for the discoloration, for, when exposed to gaslight, the color only changed after four months. Professor Wiesner recommends the following to aid in the protection of wood-pulp paper. Sunlight is the most injurious light. Very weak, shaded daylight, especially in very dry rooms, will take but little effect. Gaslight, owing to the limited refraction of its rays, is almost wholly harmless. On the other hand, electric light, and, in fact, every light having strong refraction, is favorable to discoloration. Therefore, gaslight should be preferred to electric light in illuminating libraries if the danger of discoloration is to be considered.

THAWING FROZEN GROUND.—It often becomes necessary in northern latitudes, and sometimes among the mines of our own State, to make excavations in frozen ground. Unless the frost is first removed from such ground, its excavation is almost as difficult as though it were solid rock. It has also been found that the artificial removal of frost from ground is very tedious and difficult. Some one has recently called into use quicklime, and, it is said, with excellent success. The surface where the excavation is to begin is covered with alternate layers of lime and snow. The lime becomes slaked, and heats the soil so effectually that after 10 or 15 hours it can be dug up with the greatest ease, even where the cold is excessive. It goes without saying that where there is no snow water can be used. This makes the process a little more complicated, but it is just as efficacious. This method is restricted in its application to those cases in which the delay of a day or night is not inadmissible.

AN ACID PROOF BRONZE.—Mr. P. Reitz has devised a bronze composition which is not attackable by acids and alkalis. This alloy is adapted for use in all those cases where recourse is had to ebonite, porcelain and other materials, which, while proof against acids, are exposed to wear and are for the most part very costly. The alloy consists of a mixture of copper, lead, zinc and antimony, and consequently of materials already employed in the composition of bronzes; and so it is to the judicious proportions of the mixture that Mr. Reitz attributes the new results obtained. He melts in a crucible 15 parts of copper, 2.34 of zinc, 1.82 of lead, and 1 of antimony. This alloy is worked as usual. It is adapted for use in the manufacture of chemical products, for washing apparatus and various utensils.

RESISTANCE OF SNOW TO RIFLE BALLS.—Some experiments on the resistance offered by a bank of snow to a rifle bullet were made recently at Ottawa, by Col. White, which were most interesting. It was found that the Martini bullets fired into a bank of well-packed snow were completely spent after traversing a distance of not more than four feet. Snider bullets, in hard-packed snow mixed with ice, but not hard enough to prevent digging into it with a sheet-iron shovel, did not penetrate more than about four feet; in perfectly dry snow, packed by natural drift, but capable of being easily crushed in the hand, a bullet penetrated about four feet, and in loose-drifted, dry snow less than even feet, though fired from points only 20 or 30 yards distant.

SOME ALLEGED NEW ELEMENTS.—A. Pringle, according to the *Chemical News*, claims to have discovered six new substances in some lower silurian rocks in Selkirk. Five are said to be metals and the other is a substance resembling selenium, and which he calls *hesperium*. One metal is like iron, but does not give the rhodanate reaction, nor that with tannin. Another resembles lead, is quite fusible and volatile, and forms yellow and green salts; another is black, and he names it *erobodium*; the fourth is a light-gray powder, and the last is dark in color.

In a Mica Mine.

One of the finest mica (sometimes wrongly called isinglass) mines in this country is located on Fletcher mountain, in the little township of Grotou, N. H., about two miles from Rumney depot, on the line of the Boston, Lowell & Montreal railroad.

A cool, bracing breeze stirred the budding maples as we, rested from our early climb, again set forth to reach this industrial Mecca. Half-way up the steep incline we found the airy home of the teamster, a jolly Frenchman, perched on a broad, mossy howler, with its cellar open to the day. But this humble domicile commanded an unrivaled view of Franconia's misty ranges. Nearer by could be seen the white crown of Moosilauks, the Black and the Waterville mountains, and, seemingly at our feet, Loon lake, a perfect gem, reminding those who have been abroad of the lochs for which Scotland is famous. Still our aspirations led skyward, and soon we have reached the scene that has pleased so many with its novelty. A speedy introduction to the overseer followed, and then we were shown an animated sight. Looking down two pits, each some 35 feet deep, their sides bright with layers of almost pure mica, embedded between rocks of feldspar and quartz, we saw the companies of toilers. Some, on temporary stagings of rough boards, half-way up the pit, were wielding six-pound hammers, striking in regular succession the narrow-headed and glistening drills, held by their mates, and sinking deep but narrow cavities for the reception of the blast; some were grouped with pick and shovel in the openings below, some were pumping water that had trickled from above, and here and there were parties pushing the loaded cars to the dump, and all were hardy, bronzed-looking, yet intelligent help.

The mica lies in veins, averaging from one foot to five feet in thickness, and is often blown out in blocks, or pieces weighing from 20 to 40 pounds. This is broken into suitable shapes for carriage in large baskets, and, after being partially cleaned, is borne to the cutting-shop. This is a long, commodious building, with a wide, stationary bench running the length of both sides, having shelves above. Some five feet apart are placed steel shears having a foot and a half blade and a long handle fixed to each bench, and manned by as many strong-armed, husky workmen, of whom 15 are here employed. On the shelves before each cutter are ranged the hardwood patterns by which the mica is cut into various sizes. The proper pattern, with the mica beneath, is held in one hand, while with the other each man rapidly plies the sharp shears. The day's work is piled up before them in square compartments, and put into pound packages, ranging in size from 2x3½ inches to 8x10 inches. It is used mostly in etoves and ranges, but it is also cut for doors and electric lights.

At one end of this building sat two men splitting the layers of mica brought from the mine, with instruments resembling oyster-knives. Felling into conversation with them, we learned that they daily find specimens strongly resembling animals, utensils, etc., and were shown pieces that closely counterfeited the form of elephants, rabbits, mules, etc. One of the employes in the finishing-shop showed us a mica woman, wearing a 17th century bonnet, and another had a specimen that had appropriately been named "The Old Man of the Mountain." We also saw some curious pieces which, by contact with iron-rust, had impressions closely resembling leaves, mosses and ferns; salmon-colored mica from Canada, and some very beautiful iridescent specimens from North Carolina.

In the company's office, on the Brook road, we were shown a huge sheet of mica 2 feet long and 1½ wide, almost as clear as crystal, and a six-sided prism of nearly pure beryl, weighing 90 pounds, both of which were found in the Valencia two years ago. It is a singular fact that platinum, one of the hardest ores known, will melt in a vessel made of mica. Heat does not affect this singular product, but water in time will injure it. The layers may also be split thinner than a wafer, and often reflect all the colors of the rainbow. We took a peep into the smithy, and saw in the glowing coils of the forge a dozen or more drills of as many different sizes, at red heat, while many other implements used in the mines were strewn around, waiting their turn to be sharpened or repaired. About 50 hands are employed in or around this mine.

Descending to the finishing-shop, at the foot of the mountain, we were ushered into a large light room on the ground floor, which was thickly carpeted with the imperfect layers of mica cast aside by the female help. None of the mica from this mine, however, is thrown away, for even the refuse is ground up, mixed with oil, and used as a lubricant. In this room, ranged on stools, with trays upon the benches before them to receive the perfect pieces, sat a dozen young women, each holding a small knife of the pattern used by shoemakers, with which they rapidly and dexterously split and cleaned the shining substance. In the storeroom we saw small boxes, in form and size such as usually contain a dozen farmers' scythes, yet two of these receptacles can hold a thousand dollars' worth of mica. One hundred pounds is usually put in a box. All the marketable product of the mine is shipped to Utica, N. Y., whence it is sold to the trade.—*Boston Transcript.*

USEFUL INFORMATION.

Wares of the Japanese.

Metal work and lacquer are the chief triumphs of the Japanese craftsmen. The hardest iron, tempered to parry the blows of the keen sword of the Samurai, is by the Japanese Cellinis hammered into dragon-shaped helmets and cuirasses, life-like in their bold relief and wonderfully light in weight. The most refractory material—cold-tempered iron—yields in the hands of Metado or Miochin effects like those of plastic wax. There are metal sword-guards of mysterious alloy, having an indescribable variety of shade and reflected color known only to the Japanese—chased, pierced and encrusted with silver, gold, shibuichi, shakudo and bronze. They are worked with a patience and technical skill which are the despair of European workmen. In an inch of parti-colored metals are seen landscapes, flower pieces and battle scenes. Nearly all the pieces are signed by artists of the fifteenth to the eighteenth century. The specimens of lacquer, of which there are some hundreds, begin with the fifteenth century. Almost every piece is a study. To create these works the artist, living in the castle enclosure of his feudal prince, would spend months, and even years, patiently building up layer on layer of translucent varnish, slowly hardened and polished; powdering it with a shower of gold; raising flowers or figure subjects in relief and modeling every petal and stamen with poetical feeling and Asiatic patience. One piece is signed "Kami No Waza," showing that the artist had been raised to the honorary title of Governor of the Province of Waza, and other pieces signed "Hogen," an equivalent to baron, for the feudal lord and his artists lived in mutual intimacy and honor. A tea jar was a gift from a prince to a Daimio, and battles have been fought for what are now the bibelots of the modern connoisseur.

What some will think a notable deficiency in the collection is the absence of the large pieces of cloisonne enamel with which modern Japanese magazines and some collections are profusely decorated. But these are all apocryphal in date. The Japanese in the past were poor hands at enameling, and the early cloisonnes, of which specimens are shown, are all small and very inferior in hardness and brilliancy to the work of the Chinese. The only exceptions were the translucent enamels of Hirata Donis, in the seventeenth century, and his successors; enamels which were chiefly confined to the decoration of sword-hilts and medicine-boxes, and were objects of personal adornment rather than decorative furniture.

A collection of Japanese pottery and porcelain is carefully selected and interesting; although here, also, the Japanese, while excelling the Chinese in their pottery, never rived the brilliant enamel glazes which have made the ruby, apple-green, crushed-strawberry, turquoise, imperial yellow and other enameled china of the early Chinese dynasties inimitable. The specimens of the old Sateuma faience, gold Bizen ware, the Huata porcelain and the early Imari deserve special study. They will remove many illusions, for the market is flooded with poor imitations. The pieces shown justly maintain the reputation of the great artists of the seventeenth century—such as Kakiyemon, Ninsei, and Kenzan.

How to Design a Monogram.

Scarcely anything, says the *Art Amateur*, seems so easy as to design a monogram, yet we see very few successful ones, the most of them being a mass of mixed-up letters and ornaments of which we can find neither the beginning nor end. There is a law regulating the designing of everything, and it is this law which the true designer keeps in mind and applies to his work; the effects of obedience to this law and its violation are seen as clearly in the design for a monogram as in the design for a cathedral.

First, there should be harmony of composition—that is, the letters should so emphasize, subdue or control each other that the composition should impress us as compact, appropriate, and, being so, beautiful.

In the second place, there should be no unnecessary ornamentation; there should be a quiet and peace about the design which will always please the truly artistic. Looking at some designs, we get the impression that ornament was so plentiful that the designer saw no other means of consumption than that of burying his designs in it, for we see that there is a mass of curves, angles, shades and leaves, but nothing else.

Third, simplicity of lettering is an important requisite, as there should be no possibility of mistaking an E for a G or C, and the boundaries or outlines should be well defined.

Fourth, the order of sequence of the letters should be carefully attended to.

The common idea is that a certain number of letters are given with which to make a pleasing design, and, so far, that impression is right; but there is something beyond this. There is the art of so placing the letters that one can distinguish at a glance the first, the center and the last letter. Now, the rule to be observed to secure this result is as follows: The last letter of the monogram must be the principal feature, and must be the largest, the boldest and the heaviest letter; then the first letter must be the next in size, but the lightest in outline and color; then the central letter must

be the smallest and of an intermediate tint. If the monogram is of four letters, the two intermediate must be of the same size, and the second letter lighter in outline and color than the third.

Wood Pulp Instead of Plaster of Paris.

An important discovery has just been made at the Sognedal pulp factory in Norway, after several years' experimenting, wood pulp being used for the manufacture of the kinds of building ornaments which are generally made in plaster of Paris. The pulp is first ground from wood, and then, by a machine, pressed into any kind of ornament, such as ceilings, friezes, bas-reliefs, rosettes, etc., which are quite as well finished as similar articles of plaster of Paris. Another feature is that the articles made from the pulp show painting or gilding to great advantage. Tests have also been made with regard to their strength, by dropping them from various heights or hurling them against stone walls, the results being highly satisfactory. Thus, for instance, a bar of this material one foot in length, one inch in thickness, and five inches in width, neither broke nor sustained any serious injury on being hurled with full force against a stone wall a couple of yards distant. Naturally, too, this material is far lighter than plaster of Paris, an important advantage, as no great harm would be caused to a person by ornaments made from it falling upon him, which is otherwise with those made from plaster of Paris. It should also be mentioned that pulp ceilings, friezes, etc., are, by the hardness and compactness of this material, impervious to wet, and that they may, if desired, be fastened by nails or screws. Finally, the inventors state that ornaments made from this material cost only half the price of similar ones made from plaster of Paris. This discovery will, it is believed, give great impetus to the pulp factories which are now quite unprofitable through the low prices of paper, and the utter failures which have attended the vast production of the latter, direct from wood pulp.

NATURAL LUBRICATING OIL.—A well bored at Herscher, Illinois, to secure water for stock, throws out a barrel of dark-brown oil each day. Experts from Pennsylvania pronounce it fine lubricating oil, worth \$9 per barrel, and have leased land to sink several wells.

GOOD HEALTH.

The Cancer Discussion Continued.

We give herewith another case of successful treatment—this time a case of recent occurrence: Mrs. A. C. Vandenburg, 327 Bryant avenue; age 36; one child. No cancer in family. Breast caked after nursing, as the nipple was sunken. Saw Dr. Van Denbergh; he cut it. Saw Dr. Kane; he said it might get well "but will take a long time, your health being very poor." He said he could do no more than Dr. Van Denbergh had done. She did nothing with it for one year thereafter; when, as it was more painful and getting larger, she went to Dr. Kane, who wanted to cut it out. Saw Dr. Van Denbergh again and told him she would go to —; he said he "would bet his life she could not cure her, that it was cancer and he knew it a year ago, but did not like to worry her, as there was no cure for it." One medical gentleman whom she consulted said he might be able when he had taken it out to tell exactly if it was a cancer. Saw — on November 4, 1886, and remained under treatment till January, 1887, and left perfectly well. No return, and health good; kept getting stronger all the time, and felt great relief from pain.

Would it not be in the interest of medical science, and of humanity as well, if the doctors above mentioned would call upon Mrs. Vandenburg and ascertain for themselves whether or not she has been cured of what one of them pronounced so unmistakably a cancer, and who was so sure it could not be cured that he was ready to stake his life upon the result; while another, too cautious to express an opinion of the character of the tumor, nevertheless advised that it should be "cut out." We may remark that this patient was sent to the practitioner in question by a gentleman of thorough medical education and of the highest standing in educational and religious matters in this city. He recommended the patient to such treatment as a matter of humanity and in disregard of the obstructive code of ethics which the medical fraternity have thrown around themselves. That gentleman has expressed himself as perfectly satisfied with the result attained.

Many of our exchanges are calling attention to the character and importance of this discussion and freely expressing an opinion decidedly unfavorable to the course which is being pursued by the medical fraternity of this city in regard to this discussion. We shall soon commence to publish the "opinions of the press" in relation thereto.

PNEUMONIA AND TYPHOID.—HOW TO CURE THEM.—A correspondent of the *Baltimore Sunday News* says in regard to pneumonia: If you will permit me, I will give an unprofessional remedy or means of cure by which nine cases out of ten can be relieved in less than 24 hours, and cured in less than three days, instead of a "couple of weeks' time." Give some warm stimulating tea to help counteract the cold. Apply as soon as possible a poultice of

hot onions to the chest and renew the application frequently until relief is obtained. The onions should be mashed and heated with a little lard in a vessel suitable for it, or take some life everlasting—if it cannot be had, any common herbs may answer; boil it well with vinegar and make a mush with cornmeal. Apply a poultice of this as hot as it can be borne upon the chest of the patient and repeat at short intervals. The congestion will soon be relieved, the pain will cease, the blood will flow freely in its accustomed channels, and the patient will be out of danger in 24 hours. I would advise to be given at the same time, as a valuable assistant, a purgative composed of equal parts of cream of tartar and aloes. Some pills, which the family may have been accustomed to use, may answer just as well. The simple thing is to assist nature to throw off disease. The same treatment will cure typhoid fever, but in this disease I know of many cures having been made by simply putting mashed raw onions to the soles of the feet. In high stages of the fever they will soon turn dark; several applications generally give relief. They induce perspiration, extract the fever, relieve the pain in the head and effect a cure. If these simple directions are observed, there will be very few deaths reported in our city from pneumonia or typhoid fever.

Valuable Suggestions on Diet.

Most authorities are of opinion that cheese is indigestible, yet even on this point doctors cannot agree.

A distinguished French chemist has suggested that to make cheese digestible, a quarter of an ounce of potash should be added to every pound of cheese; while a German chemist has experimented upon several kinds of food—such as cheese, meat, milk and eggs—and he boldly declares that cheese is no more indigestible than meat and many other articles of diet.

Suppers are usually condemned. Some doctors assert that suppers are not only unnecessary, but positively harmful; that sound sleep cannot be obtained after them, and that three meals a day are sufficient.

On the other hand, others are of opinion that a light supper is necessary to procure sound sleep. After a meal, they say, blood is drawn toward the stomach to supply the juices needed in digestion. Hence the brain receives less blood than during fasting, becomes palsied, and the powers become dormant. Sleep, therefore, ensues.

A doctor says that recently he was called at 2 A. M. to a lady who assured him that she was dying. The body was warm, he says, the heart doing honest work. To her indignation he ordered buttered bread to be eaten at once. Obeying, the "dying" woman was soon surprised by a return of life and a desire to sleep.

Milk is generally considered a peculiarly nutritive fluid—indeed, a perfect food—and therefore suitable for persons of all ages when it agrees with their stomachs; yet no less an authority than Sir Henry Thomson states that "for us who have long ago achieved our full growth and can thrive on solid food it is altogether superfluous and mostly mischievous as a drink."

He also says that the primary object of drinking is to satisfy the thirst, and that water is more powerful to this end when employed free from admixtures with any solid material. Chocolate, thick cocoa, or even milk, are therefore not so efficacious in allaying thirst as water.

"So plentiful is nutriment," he adds, "that the very last place where we should seek that quality is the drink which accompanies the ordinary meal."

In this respect, at any rate, Sir Henry Thomson is at one with the vegetarians.—*All the Year Round.*

DANGER FROM HOUSE PLANTS.—Dr. Sanlbury found malarial fever to be propagated among persons sleeping in a room in the windows of which had been placed a box of earth from malarious soil. House plants cultivated in pots filled with malarious earth are a constant danger. The germs grow luxuriantly in the moisture and warm air of closed rooms. Dr. Eichwald, Professor of Clinical Medicine in the University of St. Petersburg, has given to the public facts concerning a patient of his—a lady with malarial fever—who was easily cured by treatment when confined to her chamber, but who quickly relapsed on remaining during the day in her parlor. The easy cure and constant relapse went on for a long time. At last the doctor, having become suspicious of the flower-pots, removed them from the house, and there was no further recurrence of the disease.

THE BEST TIME TO BATHE.—It is best to bathe just before going to bed, as any danger of catching cold is thus avoided, and the complexion is improved by keeping warm for several hours after leaving the bath. A couple of pounds of bran put into a thin bag and then in the bathtub is excellent for softening the skin. It should be left to soak in a small quantity of water several hours before being used. The internal aids to a clear complexion are most of them well known, and the present season is the best for a thorough cleansing and purifying of the blood. The old-fashioned remedy of sulphur and molasses is considered among the best. Charcoal powdered and taken with water is said to be excellent, but it is most difficult to take. A strictly vegetable and fruit diet is followed by many for one or two weeks.—*London Lancet.*

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

AT SUTTER CREEK.—Cor. Amador Ledger, June 4: Everything at the Wildman is running in good shape. The water is being taken out as fast as the men can lower the pump. They have sunk two prospect-holes south of the shaft, and have discovered excellent rock. The Amador canal, after a protracted siege of mishaps, is running smoothly again. Pipe-laying and repairing are about finished. Knight & Co. have received an order for a 500-horse power water-wheel to go to Alaska.

CHICAGO.—Ledger, June 4: This promising property, south of Plymouth, and little to the east of the New London, is about to be started up with renewed vigor. It has been idle for the last six weeks, on account of a number of attachment suits commenced. These are in a fair way of settlement. The mine is owned one-half by John Cupps, and the other by S. F. parties, who are providing the capital necessary for its development. A double-compartment shaft, four feet nine inches by eight feet two inches in the clear, has been sunk to the depth of 186 feet, following the course of the ledge. The shaft has been more or less in ore the entire distance, but the size of the ore body is unknown, as no drifting has been done to determine its width. The footwall appears to be of slate formation, and the hanging-wall of the greenstone character. A large quantity of quartz has been extracted in sinking, which it is estimated will average at least \$7 to \$8 per ton. Assays made of the rock have indicated a value of \$13 per ton. It is the intention to sink to the depth of 2000 feet, and then open up levels while the shaft is progressing. As soon as timbers can be got on the ground, work on the shaft will be resumed.

MCKENZIE.—The first cleanup of the Huntington roller quartz-mill operating on this claim, near Irish-town, six or seven miles east of Jackson, was made this week. The mill was running seven days, crushing 50 tons per day. Everything taken out was run through, not only quartz, but dirt, and the ledge matter on either side of the vein. The result was 6½ pounds of retorted gold, estimated at \$200 per pound. This would give \$1350 as the result of the week's run, or an average of \$4 per ton. Mr. McKenzie is highly pleased with this output. The cost of mining, milling, etc., does not reach \$1 per ton. He is talking of putting up several more Huntington quartz-mills, as the pay rock is large enough to give employment to four at least.

MISCELLANEOUS.—A contract has been let to run a crosscut 100 feet at the tunnel at Middle Bar.

Butte.

AT FORBESTOWN.—Orovine Register, June 2: Mr. Henry Vail, an experienced quartz-miner of Forbestown, says of the mines of that region, three are in active operation and two more are being developed. These promise well, but not enough has been done upon them to give them a fair test. The quartz at Forbestown is nearly all mixed with sulphurets, and there is but very little free-milling gold ore to be found. It is rich rock and will pay immensely, when properly handled, but it cannot be worked to a good profit in the ordinary manner of crushing rock in a mill. Mr. Dewey, who owns one of the lodes, is to treat the ore by a chemical process. The batteries Mr. Dewey will use are small and compact, having four discharges for the pulp, and he claims to be able to work 15 tons in 24 hours with five stamps. Mr. C. J. Nickerson, of the Golden Queen mine, is thoroughly testing his ledge before putting up any mill. While Mr. Dewey will treat the ore chemically, Mr. Nickerson intends to erect chlorination works. These ledges can be worked to great advantage, as the mills can be run by water-power. Gold quartz is not the only mineral in the vicinity of Forbestown; three miles from there, there is a large body of iron ore that some time will become very valuable. There is also a vein of black oxide of manganese, that is a substance extremely valuable in making dyes of different kinds. Near by there is an extensive deposit of marble—black, blue, green, and variegated, as well as a fine white marble. There are also large ledges of very excellent soapstone.

Calaveras.

AT MURPHYS.—Cor. Calaveras Record, June 1: The mining industry of this and surrounding districts has settled down to a matter-of-fact proposition. Pulverizers and stamps are in continuous motion. Mines are being prospected for permanent working. The Oro Plata stands at the head of the list of companies in this district for its perseverance in prosecuting developments, thoroughness in business details, prompt payment, and systematic management. There is not in the State, perhaps, a quartz-mill better adapted for the working of refractory ore than the Oro Plata Co.'s mill. All who visit it are struck with admiration with the perfect system with which the ore is treated. Quartz is at present being hoisted from the Red Wing level only, in sufficient quantities to run the four pulverizers. The large excavation, the quartz from which supplied the stamp-mill, is not being worked at present, and the stamps are now inert in consequence. The company contemplates driving a tunnel from the French gulch side of the hill, tapping the Oro Plata and Red Wing mines at a greater depth, thus greatly facilitating the extraction of ore in the various openings and particularly from the sink of the 300-foot shaft of the Oro Plata, which was shut down temporarily a few years ago on account of the abundance of water. From this tunnel all of the company's mines can be worked with greatly lessened expenses. Another mining enterprise, now reaping their reward, is the Central Hill Gravel Co.—almost in the town site—McCormic, Bisbee & Thomas.

El Dorado.

MOUNT PLEASANT.—Mountain Democrat, June 4: Additional men are being put to work on the Mount Pleasant, and a general revival of work is noticeable in this mine. Other mines are coming forward rapidly in the same locality, and it is now an assured fact that the camp will be livelier than ever this year. Peter Gross this week sold his mine on French creek to S. F. and St. Louis capitalists. We understand that the sale is for a considerable sum,

that will again put Mr. Gross in comfortable circumstances. We hear it reported all the way from \$12,000 to \$200,000. Mr. Gross will, we understand, be retained as superintendent of the mine at present.

Fresno.

WILL BUILD A MILL.—Fine Gold Miner, June 3: Louis Wilson, owner of the Wilson mine, tells us that he is seriously considering the proposition of putting up a mill on his property. Ore from the mine has been hauled a distance of several miles to Smith's arastra, on Fine Gold river, below Hildreth. The arastra can work about a ton a day, but there are no facilities of saving the rich sulphurets. Attempts have been made to prevent all the sulphurets from going to waste by running the tailings over blankets, but more than half were lost. Mr. Wilson's mine is one of the richest in the district, and with proper machinery would undoubtedly yield big returns.

HILDRETH MINING NEWS.—Donahoo & Emmons have attached Taylor & Fraiser's mine, which seems to have turned out contrary to the expectations of its owners. Fraiser went to S. F. some time ago, leaving the wages of the miners unpaid. During the past month the Abbey mill crushed about 600 tons of ore. Developments in the mine during the past week show no change of any note, except that on the 500-foot level higher grade ore was encountered. Everything is running smoothly as usual. The Francis & James people are expected to return from S. F. during the next few days, where it is said they have been purchasing heavy machinery. Everything about the mine looks encouraging, and the body of the ore opened up at the 235-foot level will be prospected further. Superintendent Wallis, of the Hildreth, feels much encouraged over developments. During the past week he has had men putting in a tank and pump at the 300-foot level in order to more easily handle the water; sinking was discontinued while this work was being done. A level is being opened at the 200. Prospecting has been going on toward the west with favorable results. Thirty men are on the pay-roll. The mill is handling 12 tons a day. The tunnel at the Hampton mine, on Prussian hill, is in 385 feet; an upraise from the face is supposed to be within 15 feet of the upper tunnel with which it will connect. The ore in this mine is rich. Messrs. Wallis & Webber are interested in the Daily prospect, located about 700 feet east of the Hildreth mine. The location is in a good locality, and the vein, which is very small, contains much free gold. Mr. Crooks has been taking out some good ore from his property on Prussian hill, which he works through a horse arastra. This property has been worked in a small way for seven years. The Beck mine below Bates is shut down for the present. The miners around Fresno flats feel considerable interest in the development of several locations on Mount Raymond. Some very rich silver ore has been brought in by prospectors. Work at the Zebra is suspended for the present, owing, it is said, to the possibility of a change of bands. The Hanover mill will be put in repair and run on custom ore. Work on the mill will be begun at once.

Mariposa.

SAXTON'S CREEK.—Cor. Mariposa Gazette, June 4: Wm. Dubosq, Geo. Lacy, and Tom Richard made a visit to the Buena Vista mill and mine. They found everything in good, ship-shape order. Messrs. Chesney & San Pedro have great faith and say the Buena Vista mine will be all O. K. in a short time. They will crush a few hundred tons, and if it turns out, as every one hopes it will, to be a good paying mine, the mill will be built on the mine. There is plenty of water in the mine to run a 20-stamp mill. The mine runs east and west. At 100 feet deep is a pay chute of two feet, and 30 feet deeper is ore of six feet in width, dipping east and west over 50 feet in length and the vein 15 feet wide. They are only taking out the rich pay chute at present, and are leaving the balance of the vein, nine feet. They take out from 20 to 25 tons every 24 hours, with six men, three-hour shifts, two men to each shift; and all picking ground, no blasting to be done.

Nevada.

NEAR THE DELHI.—Cor. Nevada Transcript, June 1: The Delhi mine is now paying well. The extension of the Delhi ledge was recently purchased from Wm. Huff and the Curnow brothers. At present 15 men are employed. Two tunnels have been run, one being 1300 feet in length and the other 700 feet. In one of the tunnels the ledge was lost for several hundred feet. It was afterward found a little over 100 feet from the mouth of the tunnel. A large number of ledges situated in the vicinity of the Delhi have been located, and some of them are being prospected. Andrew Jones is the owner of the following ledges: The Tip-Top, the Champion, the Pennsylvania, the Live Oak, the Oriental, the Sea-bird, the Egyptian Queen and the Egyptian King. The first three are situated on the north bank of the Middle Yuba river; the rest on the south bank. Those on the north bank pitch west; those on the south, east. The average thickness of these ore-veins is three feet. The ledges are well defined, as the croppings can be traced to the bed of the river. The ore contains sulphurets and galena. Abraham Dalton and Frank Whaland have located a ledge a short distance west of the General Grant. They have named it the Americus. Englebright and Beckwith have located on the south bank of the river the extension of the Pennsylvania. If the General Grant turns out as well as the Delhi, all these ledges will probably be developed.

COE MINE.—Grass Valley Union, June 2: The buildings for the new pumping and hoisting works of the Coe mine are under cover, and the machinery is being put in. The machinery will be driven by water-power—an eight-foot Pelton wheel being used for hoisting, and a four-foot for pumping. Twenty inches of water will be used under a pressure of 220 feet, which will furnish the requisite power. There has been some delay in obtaining the wheels, as the foundry is pressed with the manufacture of these wheels, working night and day on orders that are to be filled, but it is expected that everything will be in readiness at the mine to commence pumping the water out of the shaft and levels in one week from this date.

WILL ERECT A MILL.—Transcript, June 5: Alf. Tregidgo has contracted for a ten-stamp mill to be put up on the Bluebell mine at Maybet, Washington township. The machinery has been on another mine in the same part of the county, and the re-

moval of it will begin at once. The ledge in the bottom of the shaft is 4½ feet thick, and of good quality. James Wells, who formerly worked at the Wyoming mine here, is foreman of the Bluebell.

Placer.

IOWA HILL.—Cor. Placer Herald, June 4: The Red Point boys report the upraise 100 feet, and work in the main tunnel being vigorously prosecuted. From the quartz mines reports are favorable, as also from Damascus. Quartz seems to be the rage here now. Messrs. Hobson, Hoffman, Drummond & Co. are building a boarding-house at their mine near Cottage Home, and in all probability before the summer is out we shall hear more of this mine. There is some talk of another large tunnel into the divide near Indian Springs. The Morning Star mill is hammering away; just what it pays is not known, but public opinion is that it pays well. Watts Bros. continue to keep their force of men at work with good results.

Plumas.

THE KETTLE MILL.—Greenville Bulletin, June 1: For some time past this property has been undergoing repair. The crushing capacity has been largely increased by a Pelton wheel and the completion of some needed repairs. A new 20-inch belt has been supplied. At present only 10 stamps are running on ore from the mine near by, owned by J. R. Drury, the lessee of the mill. The ore is of a brittle character and easily crushed. Only a few hands are necessary to keep the mill supplied with quartz. It is difficult to find a mine more easily and cheaply worked than this one.

THE CRESCENT.—The shaft is 200 feet deep, and is lined the entire depth, so that it is quite dry, comparatively speaking. The hoisting is done by water-power owned by the company. In the 200-foot level, a crosscut 50 feet to the south has been made to what has been known as the Pet vein. The ledge is about three feet wide, and it shows a small amount of gold, though no mill-test has yet been made to prove its value. Thus far, the crosscut to the north shows nothing but blue curly rock. In the Pet vein, on the 80-foot level, 240 feet from the new shaft, the company is mining a stope of ore which was left there years ago on account of a cave immediately south of the Pet, which cave cut off communication with the old shaft. The ore-body in the face of the drift is from three to six feet wide.

RICH PROSPECT.—National, June 4: Ted and Roy Whiting, who are at work on the old French ravine quartz ledge, struck a very rich stringer this week, which promises to be a valuable find. The ledge is owned by F. B. Whiting, of this place.

THE EDMAN MINE.—Some of our townsmen visited the Edman mine, on Eagle gulch, this week. The mill runs like clockwork, and everything about the mine has a permanent and prosperous look. It is a bonanza for the owners, Messrs. Edman & Mainlund.

Santa Barbara.

THE UPPER SISQUOC.—Cor. Lompoc Record, June 4: The mineral possibilities of the Upper Sisquoc are great; placer gold can be obtained in any place, even among the grass-roots in the loam, and as for cinnabar, the whole southern slope of the ridge between Santa Ynez and Sisquoc seems filled with it. In fact so great are the possibilities of the mineral resources of that section that it would justify the organization of a co-operative prospecting company to send experienced prospectors out and make an investigation. Our party brought in some fine specimens which will be assayed.

Sierra.

GOLD.—Mountain Messenger, June 4: The total cleanups of the Bald Mountain Extension Co. at Forest City for the past month are over \$13,500, and for April and May, \$25,500. Dividend No. 11, of ten cents a share, aggregating \$6000, was paid June 1st. A well-defined, rich gold lead is being followed, and under the able control of Supt. Meikle, the prospect is very favorable for the continuance of dividends. The Gold Bluff mine is all right now. The ledge has widened to 2½ feet, and is still growing wider. If anything, the rock is richer than it was in the tunnel above. The mill will be started in a short time.

PIKE CITY.—About the welfare and prosperity of our community—the Alaska company with its 40 stamps keeps hammering out the golden grain. The General Grant Co. has a force of men at work building their ro-stamp mill and developing the mine. Mr. Wilson, of the Red Ledge, on Kanaka creek, is making preparations for development. The Sunflower Co. extended their shaft over 70 feet crosscutted to the ledge, and through the same, it being about four feet through. Through inability to handle the water, the work was discontinued. The owners are expected up shortly, when steps will be taken to further prosecute the work; and probably are long our community will be enriched by several additional bullion-producing properties.

Trinity.

A NEW STRIKE.—Journal, June 4: J. T. Wey and has shown us some specimens of the richest quartz we have seen for a long time. The rock was taken from a new discovery recently made by him in the old Enterprise mine, owned by the Gibson Bros., which he has leased for a year. He discovered the vein on the 25th ult., and has been taking out rock from that date. The ledge is from one to three inches in thickness and promises to increase in width as it is run in on. The ore is very rich, and none has yet been taken out which does not show free gold and plenty of it. The new strike is about 100 feet west of the Little Gem.

BIG BONANZA.—Mr. Thomas Miller, of Minersville, informs us that work is progressing steadily on the Big Bonanza mine of that place. A shaft has been sunk 40 feet, at the bottom of which the ledge is from four to seven feet in width between well-defined walls, and consisting of vein matter, all of which prospects well. Mr. Todd, representing Oakland parties, was at the mine last week, and is negotiating for its purchase.

THE ENTERPRISE.—From Mr. Chas. Lobdell, who has just returned from a trip to East Fork to inspect the Enterprise mine, a three-fourths interest in which was recently purchased by him in company with Messrs. Balch & Leavitt, we learn that the mine is looking very well. Mr. Leavitt has charge of the mine and is working five men. The arastra is crushing a ton a day, and there is enough ore in sight to justify the purchase price. The new owners have struck the ledge in two new places,

and are consequently in good spirits. The purchase of the Enterprise also included the Lone Jack, which has a wide ledge of low-grade ore that prospects well. The rock from the ledge will not be crushed till the company has put up a mill, which will be done as soon as the development of the Enterprise justifies it.

NEVADA.

Washoe District.

CON. CALIFORNIA AND VIRGINIA.—Enterprise, June 4: On the 1400 level west crosscut No. 1 from the south drift was extended 25 feet; total length, 126 feet. The north drift started from the bottom of winze No. 1 has been advanced 45 feet, passing through low-grade ore, in which are streaks and bunches of very good ore. Are still extracting ore from the new south stope which continue to look well. On the 1435 level still continue stoping out ore from around winze No. 2. South drift No. 2 from north line was advanced 35 feet, total length, 149 feet. It is still passing through ore, the average assays of which are low, but in which are streaks of fair ore. On the 1500 level, a west crosscut (No. 4) from the south drift was advanced 20 feet; total length, 34 feet. Are still pouring a steady stream of carbonic acid gas into the bulkheaded portion of the mine. The usual shipments of ore have been made to the river mills, and the pulp assays are about up to the usual average.

IOWA.—The mine is looking well, and the usual amount of ore is being extracted, with large quantities in sight. The mill has now been running steadily for three days and nights. Heretofore it was run only an hour or two at a time, on account of it being difficult to regulate the self-feeders, which are of a new pattern. These, with some alterations made, are now working very well. Outside of the batteries the silvered plates are already loaded with amalgam. This is a thing quite unexpected, as the batteries are so constructed as to hold most of the gold. They will, in a short time, begin to ship gold bullion below.

HALE AND NORCROSS.—On fifth station level the north drift has been advanced 22 feet, and is now 100 feet north from the main west drift. During the week they have started east and west crosscuts from the face of this drift. The main south drift on this level was extended 12 feet. The miners employed in this drift are now engaged in following some ore passed through back 60 feet from its face, which has a course nearly east and west. They have drifted on this ore 38 feet, and will continue to follow it, as it may lead to an important deposit. The car samples assay about \$40 a ton.

GOULD AND CURRY.—On the 300 level, at a point in the west crosscut 140 feet west from the upraise, a north drift was advanced 30 feet; total length, 76 feet. This drift is still in quartz of a good, lively appearance. On the 625 level the east crosscut from the main south drift was advanced 35 feet; total length, 343 feet. The face is in soft porphyry, showing clay slips. The winze was sunk 8 feet; total depth, 65 feet. From the bottom of this winze an east crosscut was advanced 20 feet; total length, 29 feet. The crosscut is in a mixture of quartz and clay that shows some metal.

SAVAGE.—On the 500 level are easing timbers and repairing drifts. On the 600 level the east crosscut from the fifth floor has been advanced 32 feet, and is now 77 feet long. The upraise in the quartz body on this level has been advanced 16 feet. On the 1200 level the west station from the main shaft has been repaired, and a drift started west from it. At the 1300 level are repairing the shaft station and easing timbers in the vertical shaft from this to the 1200 level.

HAYWOOD.—The ore body on the 200 level is constantly improving where drifted into, but there being great quantities of ore above, at and above the tunnel level, the greater part of the ore taken out for the milling comes from a depth of about 90 feet below the surface. They still lack milling facilities. They are steadily running the Thompson mill, but have on hand ore enough to run all the mills on Gold canyon, could they obtain them.

BALTIMORE.—The ore in the raise above the 300 level is looking well, and the quantity is still increasing. Good progress is being made in the drifts on the east and west sides of the vein, and both are showing a considerable amount of good ore. Milling ore is also being extracted on the 400 level. The vein on the 300 level is not less than 50 feet in width, all a solid body of quartz.

ALTA.—On the 800 level are running north and south along the vein in ore of a good quality. They have their dump and two large platforms filled with ore. At present, ore is not being hoisted except where it is absolutely necessary to bring it to the surface in order to get it out of the way. The north drift on this level (the 800) will be extended into Benton ground.

CHOLLAR.—The Sharon shaft and old Chollar shaft have not yet been connected by the drifts being run between them. The usual prospecting operations are in progress from the 1200 to the surface. They will probably resume operations on the 1300 level in a few days. They have there a fine body of ore which has never been fully explored.

LADY WASHINGTON.—The whole face of the drift going north on the 700 level is in good-milling ore. The ore was struck at a point about 24 feet north of the Benton line. A crosscut made on the deposit shows it to be 12 feet. At this distance north the ore may be still wider, but no crosscut has been made on it.

NORTH OCCIDENTAL.—Arrangements are being made below to work this mine through the Occidental. They will start in on the 400-tunnel level. It is said that milling ore can be obtained from that depth to the surface, and that the ore was better in the Occidental below the 400 level than above it.

MEXICAN AND UNION CON.—On the 1300 level the joint Union and Mexican drift running north-easterly was extended 30 feet. This drift is now 62 feet in Mexican ground. The joint Mexican and Ophir east crosscut was extended 25 feet; total length, 508 feet.

UTAH.—On the 472 level the north drift from the main west drift was extended 25 feet; total length, 757 feet. The face still continues in vein porphyry, passing through clay-slips showing moisture.

CROWN POINT.—The usual quantity and quality of ore is being extracted for milling, and a good

deal of prospecting is being done. The 450 and 550 levels are being opened to explore the downward extension of the ore body exposed on the 350 level.

BULLION.—Good progress is making in the north drift on the 200 level. The drift east on the 300 level for the east vein is making good headway. The south drift on the west vein on this level is passing into quartz that begins to yield assays.

SIERRA NEVADA.—On the 520 level west crosscut No. 9, from the north lateral drift No. 2, 160 feet south from west crosscut No. 1, was extended 45 feet; total length, 432 feet. The face continues to a mixture of quartz, clay, and porphyry.

OCCIDENTAL.—On the 200 level are cutting out a station from the north incline winze 88 feet on the slope below the 100 level. In the lower tunnel upraise tunnel No. 2 was extended 20 feet; total length, 194 feet.

BEST AND BELCHER.—On the 800 level west crosscut No. 4 was extended 20 feet; total length, 467 feet. The face is in porphyry and quartz, showing value by assay.

ANDES.—The winze on the 240 level is down about 30 feet, and is still showing some ore. The upraise from this level (near the winze) is also in ore of a fair quality.

OPHIR.—On the 1300 level, north winze, No. 1, was sunk 10 feet; total depth, 45 feet. It is leaving the old stone timbers and shows low-grade ore at the bottom.

YELLOW JACKET.—All parts of the mine are looking well, and all the ore is being extracted for which milling facilities can be found.

BELCHER.—About 100 tons of ore are extracted daily. The Santiago mill, Carson river, is now to be run on ore from the mine.

KENTUCK.—The daily output of ore is about 50 tons. Most of this ore is crushed at the Rock Point mill, Dayton.

OEST.—Still extracting the usual amount of good milling ore.

Araba District.

ORE.—Cor. *Silver State*, June 3: Our mining interests are looming up a little. Geo. Lovelock is shipping ore from Arabia district to the Reno Reduction Works, which pays a small profit over the cost of extraction and shipping. Bernice has taken a new lease of life under the management of W. W. Williams, who has purchased the Bothwell mill and store at that place. A force of men has been put on the Golden Crown mine to take out ore in sufficient quantities to keep the mill constantly running. Last week's stage brought in two bars of bullion valued at \$2000, the result of four days' run of five stamps. Mr. Williams intends to increase the capacity of the mill by five stamps more, as there are other mines in the camp that will contribute sufficient ore to keep them running.

Eureka District.

ORE SHIPMENTS.—Eureka *Sentinel*, June 7: During the past week, ore shipments were made from the mines of the district to the Richmond works—Silver Lick, 30 tons; Lizzie L., 11 tons; Silver Connor, 101 tons; Jackson, 62 tons; Basye, 2 tons; Whipcorwill, 45 tons. To the Eureka Con. works—Reeves & Berry, 21½ tons; Dunderberg, 51½ tons; Morning Star, 2 tons; Kentuck, 1 ton.

Julian District.

EMMA.—Julian *Sentinel*, June 3: The Emma mine, between here and Banner, owned by John Ryan, is now being worked by Sanford & Sullivan.

THE BANNER MINES.—Julian *Sentinel*, June 3: Banner is booming. The Ready Relief is moving as usual. Fray, Brittingham & Woods are now pushing the work on their tunnel at the Hidden Treasure; when completed it will be 250 feet long, through hard rock. They deserve success. The Cincinnati Belle, owned by W. L. Fredrick, is looming up wonderfully rich. No doubt this is one of the best mines in the Julian district. The old Kentuck, now known as the Standard, is being sought after by outside mining men. Thousands of dollars have been extracted from this mine in times past.

Morey District.

AT WORK.—Belmont *Courier*, June 7: Work is prosecuted with the usual energy in the mines of Morey, in Eastern Nye.

Northumberland District.

SILVER ORE.—Belmont *Courier*, June 7: Messrs. Adams, Brewer and others are finding good silver ore in their mines.

San Antonio District.

PROSPECTING.—Belmont *Courier*, June 7: Asa B. Eastwood informs us that the work of prospecting goes bravely on in San Antonio mining district, Nye county. In some of the claims the ore carries gold; in others, the ore is rich in silver. An assay of ore from that district, made recently, gave as high as \$40 in gold to the ton. It is Mr. Eastwood's intention to prosecute the work of prospecting energetically the coming summer, and be as strong hopes of finding extensive and rich bodies of ore in that district.

Tuscarora District.

COMMONWEALTH.—Have broken ground for a 2½ compartment shaft, and sunk the same to the depth of 8 feet. Have commenced work in the northwest gangway of the Nevada Queen, which has reached our south end line. This will be extended to the shaft just started, and connection made at the depth of 300 feet. The present face of gangway is in very favorable looking porphyry, and the strata of high-grade ore, that are being cut, indicate the close proximity of a ledge.

DIANA.—The machinery is being put in good repair, and work will be resumed on the lower levels in a few days. Arrangements have been made to prospect the west side of the mine, by extending crosscuts east from the 150-foot level of North Belle Isle. The first crosscut will be started at once.

NORTH BELLE ISLE.—North gangway on the 400-foot level has entered better breaking ground; progress the past week, 20 feet. Work will be commenced next week on the foundation for a new hoisting plant.

BELLE ISLE.—The 150-foot level has been advanced a total distance of 157 feet. The formation is more favorable for ore. North drift from same has been extended 9 feet; total length, 145 feet.

NEVADA QUEEN.—Shaft has been sunk 14 feet,

and will be finished in two weeks. Northwest drift, 200-foot level, has been advanced 27 feet, and has reached south end line of Commonwealth mine. Formation is stratified with seams of high-grade ore.

NAVAJO.—*Times-Review*, June 3: No material change to note in any of the workings. Good progress has been made with the work at all points.

Union District.

AT IONE.—Esmeralda *News*, June 4: Ione is one of the oldest camps in Eastern Nevada; it was once the county seat of Nye and a booming camp. The richest kind of ore has been and may now be extracted from its mines. The mining district is known as Union, and extends from Gold Park south along the range to a point beyond Grantsville to what was formerly known as Milton canyon. There are large quantities of low-grade ore on the dumps of all the mines in the district, and if the Nevada Central railroad is ever extended south to connect with the C. & C. at Soda Springs, the whole section of country south of Austin, up Reese River valley, may be benefited. What is needed is immense reduction works with concentrators to economically reduce the ore. There is no section of country that presents the inducements and advantages of Union district. At a point on Reese river, below John Gooding's ranch, water can be had from the river to propel any amount of machinery, and the distance from there to the mines would not exceed four or five miles; with the country covered with the finest of nut pine timber. There is a grand opportunity for capitalists to take hold of property, which can be obtained at a reasonable price. There is no reason why the ore of Union district could not be reduced at a very low cost.

Wild Rose District.

SYSTEMATIC MINING.—*Silver State*, June 4: Lawyer Deal, of Virginia City, returned yesterday from Spring City. He says he never saw more systematic mining than that of the Paradise Valley mine, under the direction of Superintendent McCurdy. Everything runs like clock-work, and the drifts and tunnels are arranged so as to get ore and waste rock to the surface at the least possible cost.

PARADISE VALLEY.—*Silver State*, June 7: For week, milling ore delivered to the mill—Paradise mine, 75,830 pounds; Wild Goose mine, 28,400 pounds; total, 52 tons, 230 pounds. Average assay value per ton, 27.40 oz. silver; 0.14 oz. gold. Mill run 190 hours and reduced 80 tons of ore and 64 tons of tailings. Concentrates produced, 426 sacks, 33,032 pounds, par value, \$5378.74. About 110 feet from present face of the Wild Goose drift we cut a seam, some four or five inches wide, carrying some water, a little quartz and considerable iron, which may possibly prove to be the ledge at a point where it is pinched. The stoop on the upper level of the Wild Goose shows some improvement as we raise and go north; now have some eight feet of fair milling ore.

Willow Creek District.

ARASTRAS RUNNING.—*Silver State*, June 1: Sam Heintzleman returned yesterday from a trip to the Willow Creek mines. He says there are several arastras running there, and the Choate boys seem to be doing well. He did not have time to make a thorough examination of the mines, but as far as he was able to observe they look promising.

ALASKA.

BULLION.—*Alaskan*, May 25: The shipment of gold bullion from the Paris mine, Douglas island, by the last mail steamer was by far the largest yet made—eight bars, said to be of the value of \$20,000 each.

SILVER BAY.—Things are likely to boom in the Silver Bay district henceforward, dependent only on the result of investigations already in progress and soon to follow. While in the East, Mr. Haly made conditional sale of what is known as the Haly and Rogers lode, and his Free Gold Ledge, to strong parties. One of these syndicates is represented by Mr. L. Q. Olcott, who came up on the Ancon and lost no time in setting men to work in unwatering the shaft on the first-named property. It is the intention of Mr. Olcott, in accordance with his instructions, to take average samples of the vein-rock from every part of the shaft, which is down 50 feet in the ledge, and take it to San Francisco for a practical test, upon the result of which will depend the question of future operations. Should the test prove satisfactory, mining operations will be commenced and pushed with vigor and without delay. In the other case the parties have until the first of July in which to investigate and decide whether they will close the trade finally, and their representative may be expected here some time next month. The erection of mills on both these claims will speedily follow a satisfactory conclusion of the pending examination and tests. It is also understood that Capt. P. T. Tracy, who has an option for the purchase of the Mooney ledge near the head of Silver bay, and nearly opposite the landing, has concluded arrangements which will result in a thorough examination of that property, together with a practical test of the rock. Altogether, it looks as if the coming summer would be one of unusual activity at and around Silver bay. That the work to be done will result in proving beyond all question the very great value of at least some of the ledges, scarcely admits of a single doubt.

ARIZONA.

PACKING ORE.—Prescott *Courier*, June 6: Messrs. Riggs & Lawler have engaged a 30-animal pack train to transport ore from the mine to Prescott. It is said that their ore will yield over \$200 a ton, mostly gold. W. T. Richardson, just from Alexandra, tells us that the new pump is in place and hoisting water. He has 12 men at work, and expects to have the mine dried in 10 or 12 days. Martin Maier, who has just returned from the mountains, says he passed 12 large teams, hauling machinery to Diamond Jo and other camps; saw a great many miners at work, and is confident of much better times here and hereabouts. Humburg district people tell of chlorides who are making plenty of money. They have shipped over \$200,000 worth of silver ore the past year. The best news yet is, that the Prescott sampling works will make their first run to-day. Steam was started Saturday last, and everything worked well.

TOMBSTONE.—*Democrat*, June 6: The T. M. & M. Co. has put a force of men on the Lucky Cuss

and Wedge, taking out manganese ore for flux at the Charleston smelter. At the West Side they are busy putting in the new eight-inch pump, which will be completed in about two weeks, when the company will start up their mill. The Grand Central shaft is now down 100 feet. The Grand Dipper shaft is down to the 300, and work on the drift to connect with the Grand Central has been commenced. At the Rattlesnake, development work on the 400 still continues, and the drift is in about 45 feet. The winze from the 300 is down 100 feet, all in ore. The Emerald still ships her usual quota of ore.

IDAHO.

EAGLE CITY AND VICINITY.—*Cœur d'Alene Record*, June 1: About 50 persons spent the winter at Eagle. At the head of East and West Eagle creeks and their tributaries the snow yet lies quite deep. The warm weather melting the winter's snows keeps the streams continually bank-full, making travel by horseback impossible. Frank and Henry Whittle are working on their leads about Doctorville, on West Eagle. Quite a number of men are placer mining on East Eagle near the mouth of Tributary gulch. The gold found here is the finest produced in Cœur d'Alene. The summit of Old Baldy is still snow-capped, yet many have started in to work their quartz leads. Supplies are packed up the trail along the hog-back or point of the mountain. Robinson Bros., in Fancy gulch, have 1400 feet of bedrock flume in place, but are hampered on account of the lack of water, they having to reservoir to get a supply for part of the day. Below town, on main Eagle, McGuire & Co. are making wages ground-slucing on the north rim of the creek.

MONTANA.

GEORGETOWN AND PHILIPSBURG.—*Inter-Mountain*, June 3: R. B. Wallace returned last night from the mining district about Georgetown and Philipsburg. He says the snow is going off rapidly, and the water is so high as to be a serious inconvenience. The Pyrenes mill is running all the time. The mine is looking well, but there is considerable water in the lower levels. Sufficient ore is being taken out between the 100 and 200-foot levels to run the mill. Everything at Philipsburg is looking well. The Hope is running on a fine body of ore. The Granite Mountain is as busy as ever. There is great fear that a shut-down of the mill will be necessary on account of a lack of salt. The Granite Mountain gets its supply of salt from Michigan, over the Northern Pacific, and consumes eight tons per day. There is at present only one carload of salt west of the Mullan tunnel, and there is no supply on hand at Philipsburg.

ANACONDA.—*Review*, June 4: The Anaconda Company is pushing forward the work at the new concentrator. There are 175 men engaged in placing machinery in position, or mason work, and in the framing yard. The masons are at work putting in the rock foundation and brickwork for the new boilers; three double sets of steel, which is to furnish the steam-power for the new 1000-horse power, which is to be placed in the power building. This engine will be the largest one west of the Missouri river, and will furnish what power is needed after an 800-horse power is utilized. At the main concentrator building, which is 320 feet in length, a portion of the shafting has been put in, and the vats, pans, and settlers are already in position. There are 18 settlers and 36 pans, which are to be fed from the 60-stamp mill immediately above. The batteries are in position and nearly all the machinery. Just above these stamps will be placed three steam stamps which will handle 500 tons of ore per day, and just above the steam stamps is the ore-house which is reached by the railway, and into which will be dumped the ore. It is expected that the works will be completed and ready for operation by September 1st, and when they commence it will take 2000 tons of ore per day to run both the upper and lower works. There are many people who do not believe that there is ore enough in Butte to keep this mammoth smelter going a great while. It is simply a question of mathematics. Conservative experts state that there is ore enough right in sight in ore property of this company's to furnish 2000 tons daily for 18 years.

HIGHLAND.—Butte *Miner*, June 1: E. F. Dunckel arrived last evening from the Highland gold and silver district. He reports the snow as deep yet and very little work being done upon the mines. Mr. Dunckel brought in several pieces of rock from his own mine, which assays from \$250 to \$400 per ton. Dunckel will soon have a large force of men employed to develop his valuable location the coming season. The prospects are flattering. Indications of a rush to the new diggings are decidedly strong. J. T. Robbins, late foreman of the Montana Copper Co., has just returned from Argentina, Beaverhead county. He informs us that the Tuscarora has one shaft down 40 feet on a bed of ore, with good walls. The claim is 400 feet in length by 120 feet in width, and has been prospected thoroughly. The ore body shows up for nearly the entire length and width of the claim. It goes well in silver, lead and carbonates generally. Stopping is being done on the first and second levels of the Elm Orlu, and between 50 and 60 tons are produced every 24 hours. Forty men work about the mine. The shaft is going down to the 300 steadily. The ore in the mine averages about \$30 a ton. Great praise can be freely accorded the management of this mine, it having been opened only two years ago, and has paid from grass roots down to its present depth. John Nugent is the superintendent of these works.

NEW MEXICO.

CARLISLE.—Clifton *Clarion*, June 2: This excellent mining property has changed hands, having been purchased by a foreign corporation, and is now known as the Carlisle Gold Mining Co., limited, with headquarters in London, England. The price paid is said to be \$500,000. Mr. J. Longmaid is the superintendent for the new company, succeeding Mr. D. B. Huntly, who, he is said to his credit, was the first to make the property a paying investment. Mr. Longmaid, in his management, is following closely in the footsteps of his predecessor, and no doubt, like him, will make a success. He is ably assisted by his son, who has the management

of the mill, which now consists of 40 stamps, but the ground is now being prepared for 40 more. The main shaft of the mine is down some 400 feet, but preparations are being made to sink 200 feet further. Drifts are run every 100 feet, and if reports are to be believed, each and every one of them is in ore, low grade, it is true, but which it will pay well to work. There are many other excellent prospects in this section, and it is only a question of time before they are fully developed.

BONITO BULLION.—Rio Grande *Republican*, June 4: The Bismarck mine pans away up. Mr. Danner is running two arastras on Hopeful ore with good results. Minor Gaylord took out in a 44-hours' run on Hopeful ore with a rocker, \$75. Theo. McKelley is developing the Maud Muller. It is a panning prospect and is looking well. Hamilton Bros. are working the Hoosier Slide and Little Buck Shot. They both show gold in the pan. Development on the Hopeful still proceeds. Shaft No. 2 is down 60 feet, and all in ore. The ore taken out more than pays for sinking. Parsons has let a contract for 100 feet of tunneling on the Hopeful. The ore that comes out doubly pays for the work. The tunnel face at the base of the hill, on the Hopeful, shows free gold, and it is also found in the bottom of shaft No. 2, at a depth of 60 feet. Banner & Wingfield have discovered free gold in a new mine. It is called the Dead Oak. They have timbered and are sinking.

PALOMAS.—Socorro *Bullion*, June 4: The camp at Hermosa has become one of the steady producers of New Mexico, and the ore output increasing. Like most other mining districts in the territory, the best properties are owned by men of limited means, who not being able to push developments, are forced to do most work, and often all, themselves, and under the disadvantages of not having everything at hand necessary to the speedy development of their claims, still they are pushing work on and gradually coming to the front in a way that is sure to receive its just reward. Probably one of the most promising is the Eagle group, owned by Day, Miner & Kendall, and others, which is now producing and shipping to Socorro. The ore is argilliferous galena, running high in silver, and shows a good body in a well-defined line fissure. The working shaft is 65 feet deep, and the owners are sinking on ore. This group of mines is recognized as among the best appearing properties in the range.

WHITE OAK.—*Interpreter*, June 4: The Hannibal group of mines, composed of the Hannibal lode and Hannibal No. 2, have been surveyed for patent by W. F. Blanchard, U. S. D. M. S. These prospects have had little more than assessment work done on them for several years, yet they have produced some of the richest ore in the camp. The seams in these properties are more or less broken and faulted, and like most mines require some expenditure to open up the ore bodies, but they will amply justify the owners in making the required expenditure for their thorough development. This has been the case with all the locations in White Oaks which prospecting at all at the grass roots.

OREGON.

QUARTZ AND PLACERS.—Jacksonville *Times*, June 3: Operations continue at Cornelius & Co.'s quartz-mill and the Swinden ledge with the best results. Smith & Lynch, of the Wagner creek placer mines, have ceased piling for the season. They will be engaged in cleaning up for several months. August Brentano has purchased the Hope ledge on Wagner creek of J. W. Walsh and Geo. M. Willard, and will commence prospecting it on an extensive scale before long. The price paid was \$1250. Piping is now going on at Ennis & Cameron's diggings in Galice creek district, with excellent results. These gentlemen are well pleased with the work which has been done there this season, which speaks well for their mines. Parke & Lacy, of Portland, the leading dealers in mining machinery of all kinds on the coast, will soon open a branch depot at Spokane Falls, W. T. Theo. Cameron and Frank Ennis, who are interested with Geo. Simmons in a gigantic mining enterprise near Waldo, Josephine county, paid that section a visit last week. They speak well of their investment, but say that it will be some time yet before it will yield returns, as they may not be ready even next season to commence active operations in paying ground.

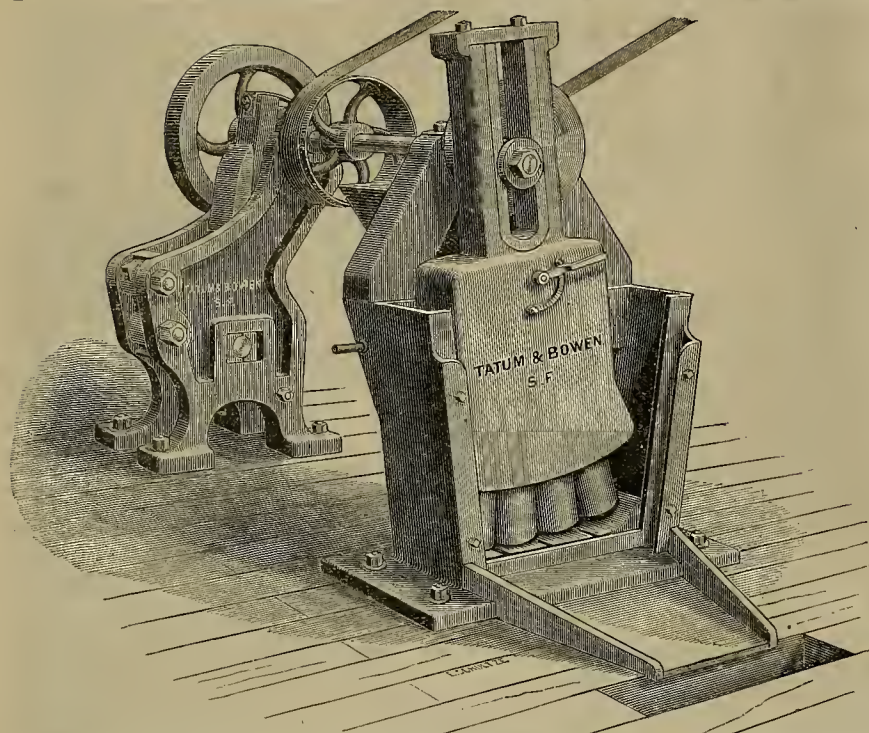
NEW DISCOVERY.—Rogue River *Courier*, June 3: The quartz ledge discovered on the hills southeast of town a few days ago by Messrs. Sterling (a mining expert) and Strickler has turned out to be immensely rich. Mr. Sterling had some of the ore assayed by Mr. Keenan, who informs us that it went over \$60 to the ton. Mr. Keenan says the rock is the best he has ever seen around Grant's Pass.

UTAH.

ROADS.—Park *Record*, June 4: The roads to Snake Creek district's ore dumps will soon be open, and among the several companies that intend to ship is the Southern Tier or Hayt property. A big dump of high-grade ore, and lots of it will go way up into the thousands, will soon be moved to market.

APEX.—Park *Record*, June 4: Chas. Read, superintendent of the Apex, came up from Salt Lake and inspected operations at the Apex. It was learned from a reliable source yesterday that over 50 tons of first-class ore was on the dump ready for shipment. It was also learned that by the 15th inst. Apex shipments would be in full blast. Everything at the mine is in ship-shape, and 10 tons of rich ore can be produced daily.

CAMP CROSSCUTS.—The Ontario mill will soon be closed down for a thorough overhauling and repairing. The mill has made a steady and successful run the past year. When closed down two brick furnaces will be built. The Crescent Co. has contracted to sell this year's output of ore and concentrates to the Hanauer smelter. Heretofore the Crescent product was sold in Denver. Discoveries of gold-bearing quartz have been made about five miles up Parley's canyon. Expert Gregg, formerly of the Park, predicts a gold excitement down there. Prospectors and claim developers are making it lively in the hills. The new hoisting machinery for the Daly, and also for the Crescent, is being put in place with all possible speed. The Boss made an initial shipment this week. Park City's ore shipments were heavier the last two months than for any like period during the camp's existence.



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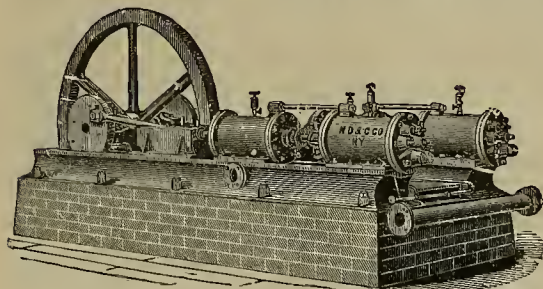
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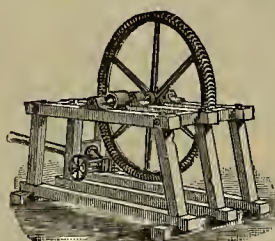
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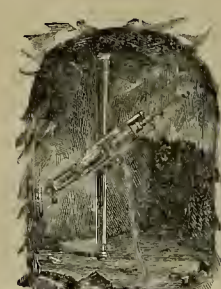
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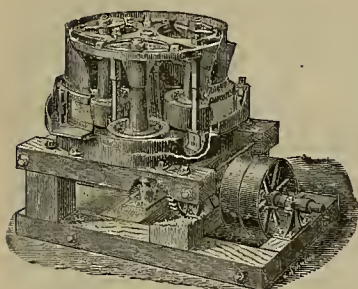
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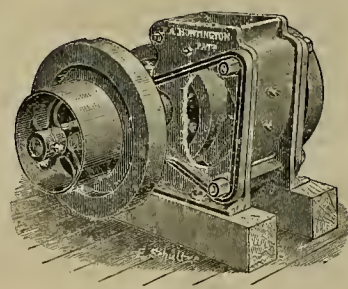


Centrifugal Roller Quartz Mill.

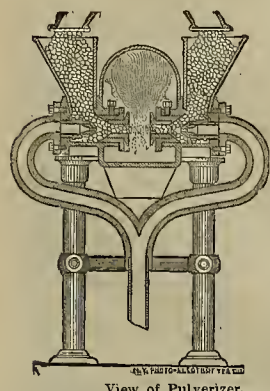
F. A. HUNTINGTON,
 MANUFACTURER OF
Centrifugal Roller Quartz Mills,
CONCENTRATORS AND ORE CRUSHERS,
 Mining Machinery of Every Description,
Steam Engines and Shingle Machines.

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ORE CRUSHER.



View of Pulverizer.

PNEUMATIC PULVERIZER.

The principle of pulverization consists in the employment of two

POWERFUL OPPOSING CURRENTS

Of dry super-heated steam, so arranged that they continuously charge themselves with crushed or granulated material, and by the great force and velocity of the steam currents the materials are dashed against each other with such power of concussion as to cause the hardest ores to be pulverized to any degree of fineness desired. The high temperature of the super-heated steam currents employed, through which every minute particle of ore must pass, causes them to become very hot and dry, which produces a beneficial effect upon Sulphurets and ores containing rusty Gold. The light weight and simplicity of construction of the Pulverizer, the extremely small and inexpensive wearing parts, are the WONDER and SURPRISE of all who witness its operation. The Company is prepared to furnish complete plants for pulverizing

10 TO 200 TONS PER DAY,

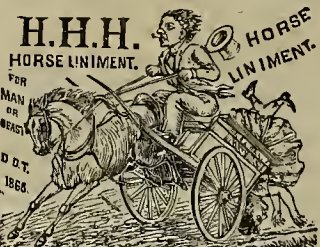
Including a Sectional Steam Boiler supplying all the power required.

PNEUMATIC PULVERIZER COMPANY,

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Write for Particulars.

L. F. HOLMAN, Pres't.
 F. A. LUCKENBACH, Sup't.



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For Sale by all druggists.



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MACHINERY,

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And Assay Office.**

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SHEET LEAD,
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C. A. LUOKHARDT, Manager.

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Mining Engineers and Metallurgists.

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Corner of Leldesdorf Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

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Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

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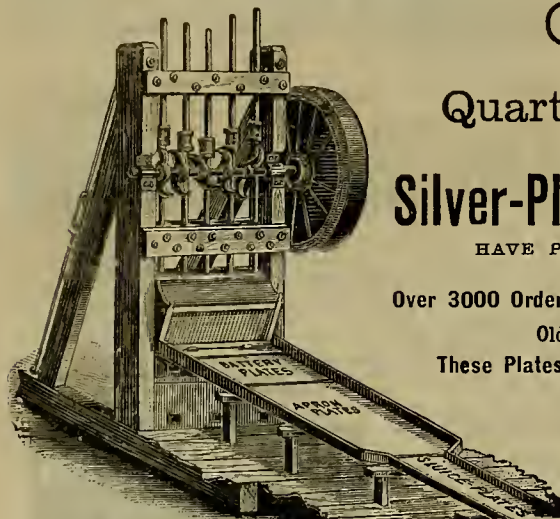
Gauge, 20 inches; height, 5 feet 6 inches; width, 4 feet; weight (fully watered and coaled), 8 tons. Also one extra set wheels, tools, 80-pound iron rails, etc.

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Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globs Cases, free of cost, by applying to the manufacturers.

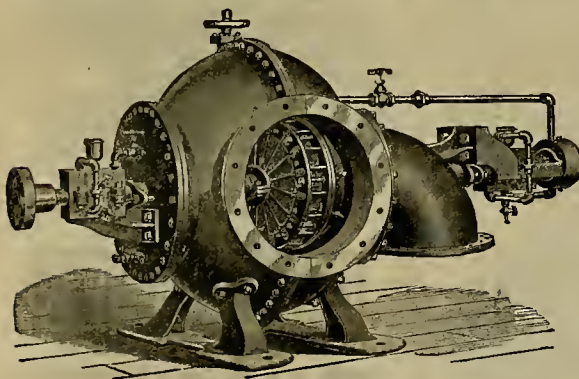
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THOMAS PRICE'S ASSAY OFFICE,

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COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 262 Market St., S. F.

FOR WEEK ENDING MAY 31, 1887.

- 363,941.—CANNING—D. E. Ashby, S. F.
 364,085.—RUCHING FOR DECORATIVE PURPOSES—E. A. Bohm, S. F.
 364,158.—DREDGER—A. B. Bowers, S. F.
 363,984.—TRANSON—J. C. Brown, S. F.
 363,991.—CART—H. J. Diggle, Fort Jones, Cal.
 363,955.—CARTRIDGE CRIMPER—J. A. Haas, Port Costa, Cal.
 364,023.—WHIP—E. B. Knapp, San Jacinto, Cal.
 363,993.—WHEEL FOR PLOWS—H. T. Owens, Graton, Cal.
 363,966.—TRACTION ENGINE—Jacob Price, San Leandro, Cal.
 363,854.—SAW SETTER—A. Schnoor, Oakland, Cal.
 363,916.—LAMP SHADE SUPPORT—Sink & Pollock, Redwood City, Cal.
 363,972.—ADDING MACHINE—Smith & Shattuck, S. F.
 364,062.—CRUDE PETROLEUM BURNER—Thomas, Douglas, Smith & Twing, Oakland, Cal.
 363,982.—NECKTIE—H. Tintrop, S. F.
 363,866.—NAIL PLATE AND CUT NAIL—Geo. T. Walker, Napa, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

PROCESS OF CANNING.—D. E. Ashby, S. F., No. 363,941. Dated May 31, 1887. This invention relates to a process for cooking substances in jars or cans in which they are to be hermetically sealed, and it is especially applicable to the cooking of such substances in glass jars in such a manner that the glass packages will not be broken by rapid heating and cooling. In this invention the jar is gradually exposed to the conductive power of the heat of the containing vessel and the thin surrounding envelope of water within it, and all danger of breakage from this cause is averted.

TRACTION ENGINE.—Jacob Price, San Leandro. No. 363,966. Dated May 31, 1887. This traction engine is especially for use on ordinary roadways or fields. It consists of an engine and boiler mounted on suitable bearings and traction wheels and an interminably oscillating clutch mechanism of peculiar construction, by which the reciprocating motion of the engine is transmitted to the driving wheels, so as to produce a continuous rotary motion of the same without the intervention of gearing; and it also consists in a means for adjusting the transmitted stroke and the consequent power which is applied to the engine.

ADDING MACHINE.—Brainard F. Smith, Sacramento, and Arthur E. Shattuck, of San Francisco. No. 363,972. Dated May 31, 1887. This invention relates to that class of adding machines in which the independent wheels, having upon their peripheries different digit and multiples of said digit, are separately actuated by means of levers, and the invention consists in the combination of the spring-actuating wheels, the pivoted keys, and the ratchet and escapement-pawl mechanism. The object of the invention is to reduce a long column of figures to a short one.

CARTRIDGE CRIMPER.—John A. Haas, Port Costa. No. 363,955. Dated May 31, 1887. In the mechanical devices for loading paste-board cartridges for shotguns, after the powder, shot and wads are in their respective positions, it is necessary to crimp the edge of the cartridge smoothly, that the contents may be held firmly in position. This is generally done by a crimping attachment which consists of a piece of metal suitably formed to press on the edge of shell with a solid projecting center which rests on the upper wad. By reason of the varying thicknesses of wads, the form of crimper generally in use is far from satisfactory, as sometimes it breaks down the edge of the shell or causes the shell to bulge out at the center and makes an enlargement there. The solid pieces wear out very rapidly and have to be constantly changed. At each variation of charge the crimper must be changed to suit the new conditions. The new crimper covered by this patent removes all these objections. It has a movable and self-adjusting center and a removable and interchangeable crimping portion. By its construction full or light wads in the cartridges will make no difference in the smoothness and uniformity of the crimping. Varying loads may be treated without changing the crimper. The removable crimping flange may be taken out and changed whenever worn. This crimping device has been attached to the Chamberlain cartridge-loading machine in use by the Selby Smelting and Lead Company, and works very satisfactorily.

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, June 9, 1887.

ANTIMONY—French Star	91 @	27 00
IRON—Glenbrook ton	— @	25 50
Eglington ton	— @	25 50
American Soft No. 1 ton	— @	25 50
Oregon Pig ton	21 00	23 00
Clippert Gap, Nos. 1 & 4	22 00	23 50
Clay Lane White	22 50	@
Shots, No. 1	23 00	@
COPPER—		
Bolt	19 @	21
Sheathing	18 @	—
Ingot	12 @	13 1/2
Fire Box Sheets	— @	21
LEAD—Fig.	— @	50
Bar	5 25	5 50
Sheet	8 @	—
Buck, #8 bag	1 50	@
Shot, discount 10% on 500 bag	Drop, #8 bag	1 50 @
Chilled, do	2 00	@
QUICKSILVER—By the flask	40 00	@
Flasks, new	1 05	@
Flasks, old	85 @	—
STREET—English lb.	16 @	23
Black Diamond, ordinary size	8 @	15
Pow	34 @	6
Machinery	3 @	6
Naylor & Co.	10 @	14
Zimmerman	8 @	9
Sheet, 7 1/2 ft. by 7 to 10 lb. less the case	8 @	—

New York Metal Market.

Telegraphic advices dated June 9th give the following

New York prices:

BAR SILVER—95c per oz.	
BORAX—51 @ 54c.	
COPPER LAKE—\$10.40	
IRON—No. 1, \$22.00	
LEAD—\$4.30 @ 4.35	
QUICKSILVER—\$3.50 @ 3.55	

The following is the latest by mail from the "New York Metal Exchange Market Report":
 COPPER—Quiet, spot closing at \$9.95 @ \$9.95. Transferable Notices (Lake) issued at \$9.95 @ —. Transferable Notices (Chili Bars) issued at \$9.95 @ —.
 LEAD—Firm at \$4.07 1/2 @ 4.75 spot. Transferable No. 1, \$4.75 @ —. Transferable No. 2, \$4.75 @ —.
 TIN—Quiet at \$23.00 @ 23.10. Transferable notices issued at \$23.05 @ —.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.
 Australian Tin, \$23.00 @ 23.25; Billiton Tin, \$23.00 @ 23.60; Banca Tin, \$23.00 @ 24.00; Baltimore Copper, \$9.05 @ 9.25; Orford Copper, \$9.00 @ 9.25; P. S. C. Copper, \$10.00 @ 10.25; Foreign Lead, \$4.67 1/2 @ 4.75; Foreign Spelter, \$4.70 @ 4.75; Antimony, \$7.65 @ 7.70.
 MARKET'S Prices at sidewater. 100-ton lots of listed items (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$20.00 @ 21.00; No. 2, \$19.00 @ 21.00; Grey Forge, \$17.50 @ 19.00; Hudson River, Grade No. 1, \$20.00 @ 21.00; No. 2, \$20.00 @ 21.00; Grey Forge, \$17.50 @ 19.00; Southern, Grade No. 1, \$21.00 @ 22.00; No. 2, \$21.00 @ —; Grey Forge, — @ —.

Mining Share Market.

There has not been much activity in mining stocks during the past week. What fluctuations occur are by no means large. Concerning the Comstock mining situation, the *Enterprise* says: "In the mines it has been many years since there has been so much ore in sight. They have it all along the Comstock from the north end mines down to Silver City—have stacks of it. In the Chollar, Potosi, Alta, Justice, and several other mines, the drifts and other openings in the lower levels are stowed full of ore. In other mines where the work of extraction and shipment is in progress, they have great quantities of ore opened up and in sight. When all begin to hoist and mill their ores the old Comstock will hum; there will be a bigger output of bullion than has been seen for many years. The stone foundation walls at the new water-mill, near the Chollar shaft, are being rapidly laid up. All activity there, not only among the stone-masons, but also among the carpenters and millwrights. At the California stamp-mill and also at the big pan-mill preparations are being made for the driving of the machinery by water-power."

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Delhi, June 4, \$21,200; Con. California and Virginia, 4, \$72,980; Germania, 1, \$23,433; Hanauer, 1, \$9750; Bannock, 1, \$1400; Hanauer, 3, \$4950; Germania, 5, \$3800; Hanauer, 5, \$2400; Bald Mountain (for May), \$13,500; Margat Ann, 1, \$3572; Silver Bow, 1, \$29,280; Lapanta, 1, \$3500; Eureka, 2, \$5250; Alice, 1, \$32,128; Moulton, 1, \$16,144; Bluebird, 1, \$20,416; Daly, 4, \$63,329. Ore receipts at Salt Lake last week, \$42,300, by Wells, Fargo & Co.; \$26,750 by McCormick & Co., including \$4700 Crescent; \$14,079.52 by T. R. Jones & Co.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court Department to, San Francisco:

KNICKERBOCKER CON. M. CO., June 4. Capital stock, \$10,000,000. Directors, F. W. Sharon, W. E. Sharon, R. N. Graves, J. P. Martin and W. S. Wood.
 TREASURE-BOX M. CO., June 4. Capital stock, \$1,000,000. Directors, O. C. Hewitt, J. M. Bryan, F. A. Smith, C. H. Hubbard and J. O. Coleman.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

To Mining Men.

FOR SALE AT A BARGAIN—A new 30 to 60 H. P. Engine, with governor, pump and heater, new and complete, \$425 cash, F. G. B. in S. F. Two Triumph Concentrators in perfect order and almost new, \$800 each, F. G. B. in S. F. Apply to A. P. WHITEHEAD, 908 Market St., San Francisco.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AMT.	LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Best & Belcher M. Co.	Nevada, 37.	50.	June 3.	July 8.	Aug. 2.	L. G. Horn, 309 Montgomery St.
Central California M. Co.	Cal. 60.	1.00.	Apr. 27.	June 6.	June 22.	J. G. Hulse, 314 California St.
Crocker M. Co.	California, 4.	15.	May 16.	June 22.	July 13.	A. Waterman, 309 Montgomery St.
Champion M. Co.	California, 24.	10.	Apr. 19.	May 1.	June 21.	T. Wetzel, 322 Montgomery St.
Challenge Con. M. Co.	Nevada, 3.	30.	May 26.	June 28.	July 15.	C. M. McCoy, 339 Pine St.
Gray Eagle M. Co.	California, 2.	01.	May 17.	June 22.	July 11.	T. Wetzel, 322 Montgomery St.
Golden Piece M. Co.	California, 3.	10.00.	Apr. 26.	June 3.	June 30.	W. J. Gleason, Phelan Building
Gould & Curry S. M. Co.	Nevada, 56.	50.	June 3.	July 8.	Aug. 2.	A. K. Durhrow, 309 Montgomery St.
Hahert Concentrator Co.	California, 2.	10.	Apr. 16.	May 25.	June 15.	M. Livingston, 320 Montgomery St.
Heath M. Co.	Idaho, 1.	15.	May 20.	June 30.	July 25.	W. L. Oliver, 325 Montgomery St.
Julia Con. M. Co.	Nevada, 22.	15.	Apr. 18.	May 24.	June 16.	J. Stadfield, 419 California St.
Locomotive M. Co.	Arizona, 1.	25.	June 1.	July 1.	July 20.	J. Crockett, 337 Pine St.
Morrell Con. M. Co.	California, 2.	3.	May 31.	July 2.	July 10.	W. C. Disturrell, 512 Montgomery St.
Mountain Tunnel M. Co.	California, 4.	05.	Apr. 14.	May 23.	June 13.	A. B. Paul Jr., 327 Pine St.
Mohatt M. Co.	Nevada, 8.	1.00.	June 1.	July 1.	July 20.	J. Crockett, 337 Pine St.
Mayflower M. Co.	California, 36.	25.	June 2.	July 6.	July 29.	J. Morio, 324 Montgomery St.
New Coso M. Co.	California, 20.	20.	Apr. 15.	June 1.	June 25.	J. L. Hunt, 308 Montgomery St.
Phil Sheridan M. Co.	California, 1.	10.	Apr. 15.	June 1.	June 25.	J. L. Hunt, 308 Montgomery St.
Scorpion S. M. Co.	Nevada, 21.	10.	Apr. 27.	June 3.	June 24.	G. R. Spence, 309 Montgomery St.
Trojan M. Co.	Nevada, 15.	10.	Apr. 29.	June 3.	June 30.	J. R. Scoville, 309 Montgomery St.
Venus M. Co.	California, 1.	10.	Apr. 28.	May 30.	June 17.	D. Buck, 309 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE.
Alpha Con M Co.....	Nevada,	C E Elliot.....	309 Montgomery St.	Annual.....	June 22
Bodie Con M Co.....	Nevada,	G W Sessions.....	309 Montgomery St.	Annual.....	June 20
North Belle Isle M Co.....	Nevada,	J W Pew.....	310 Pine St.	Annual.....	June 20
Owyhee M Co.....	Idaho,	J W Pew.....	310 Pine St.	Annual.....	June 28

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Con California & Va M Co.....	Nevada, A W Havens.....	309 Montgomery St.....	50.....	Apr 7.....	
Dee Bee Blue Gravel M Co.....	California, T Wetzel.....	322 Montgomery St.....	10.....	May 19.....	
Original Hidden Treasure.....	Nevada, D A Jennings.....	401 California.....	13.....	Apr 4.....	
Plymouth Con M Co.....	California.....	New York.....	10.....	Apr 4.....	
Pacific Borax, Salt & Soda Co.....	California, A H Clough.....	431 California St.....	10.....	Apr 4.....	
Paradise Valley M Co.....	Nevada, W Letts Oliver.....	328 Montgomery St.....	10.....	Apr 15.....	
Silver King M Co.....	Arizona, J Nash.....	328 Montgomery St.....	25.....	May 15.....	

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING MAY 19.	WEEK ENDING MAY 24.	WEEK ENDING MAY 31.	WEEK ENDING JUNE 7.
Alpha.....	3.00	4.60	3.50	4.30
Alta.....	2.35	4.40	2.80	4.40
Andes.....	1.60	2.24	1.75	2.30
Argenta.....	1.50	2.25	30	33
Belcher.....	3.90	5.25	4.60	5.00
Brophy.....	7.25	111	78	108
Best & Belcher.....	2.30	3.12	2.45	2.90
Bullion.....	.95	1.30	1.00	1.25
Bodie.....	.80	1.10	.80	1.10
Bodie Tunnel.....	2.55	2.90	2.40	3.00
Benton.....	1.05	1.35	1.00	1.30
Bodie Tunnel.....	1.30	1.35	1.35	1.35
Con. Va. & Cal.....	2.25	2.18	2.25	2.18
Challenge.....	2.50	3.00	2.00	2.75
Champion.....	8.50	9.00	7.25	8.50
Consolidation.....	1.50	1.60	1.50	1.60
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Caledonia.....	.65	.80	.70	.85
Con. Pacific.....	.25	.35	.30	.30
Crown Point.....	7.25	6.00	6.75	5.50
Crocker.....	.40	1.00	1.00	.55
Central.....	.50	.60	.60	.55
Dudley.....	.20	.30	.30	.25
East E. & B.....	1.40	1.35	1.40	.25
Eureka Con.....	.65	.65	.65	.65
Excelsior.....	2.00	2.00	2.00	2.00
Grand Prize.....	1.10	1.15	1.15	1.15
Gould & Curry.....	4.25	6.14	5.80	6.25
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Holmes.....	2.50	2.50	2.50	2.50
Independence.....	1.25	1.50	1.50	1.50
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Lady W.....	.75	1.00	1.00	1.00
Martin White.....	.55	.55	.55	.55
Mono.....	5.55	2.85	2.70	2.75
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Mt. Diablo.....	3.75	3.75	3.75	3.75
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Potosi.....	.40	.65	.70	.75
Pearl.....	.40	.65	.70	.75
Pearl.....	.40	.65	.70	.75
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Sierra Nevada.....	.45	.65	.55	.65
Silver Hill.....	.70	1.10	.90	1.10
Silver King.....	.70	1.10	.90	1.10
Scorpion.....	.25	.25	.25	.25
Syndicate.....	3.40	5.25	4.00	5.00
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Utah.....	4.95	6.25	5.00	6.75
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200 Alta.....	100 Lady Wash.....	1.85
250 Andes.....	100 Mono.....	2.85
250 Atlantic.....	255 Mexican.....	.64
559 Argenta.....	100 Nevada.....	1.25
220 B. & Belcher.....	200 Nevada.....	1.25
350 Bullion.....	200 Nevada.....	1.25
100 Beutou.....	400 Nev. Queen.....	.41
500 Belcher.....	200 Ophir.....	1.04
100 Baltimore.....	100 Overman.....	2.20
750 Belle Isle.....	60 Potosi.....	.71
100 Chollar.....	100 Pearl.....	.50
300 Con. Va. & Cal.....	300 Peerless.....	.85
390 Crown Point.....	100 Silver Hill.....	.50
200 Crocker.....	100 Scorpion.....	.85
350 Central.....	100 Sierra Nevada.....	.48
150 Caledonia.....	100 Seg. Belcher.....	1.55
150 Excelsior.....	100 Union Con.....	3.40
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470 Gould & Curry.....	100 Yellow Jacket.....	.51
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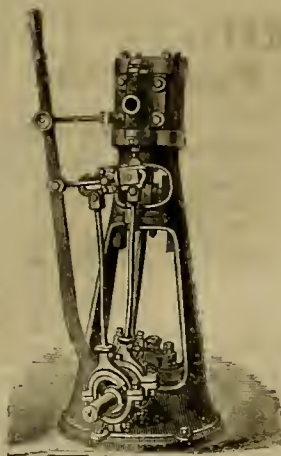
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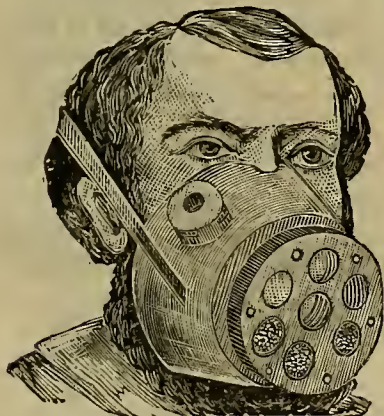
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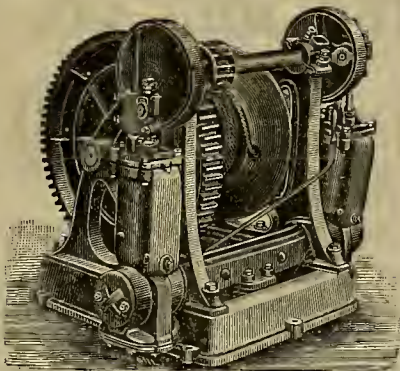
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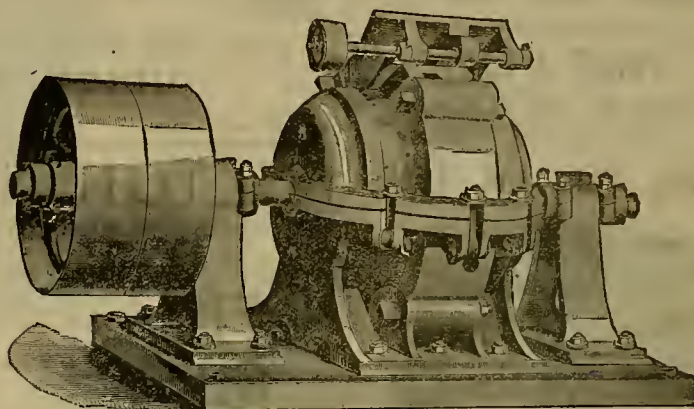
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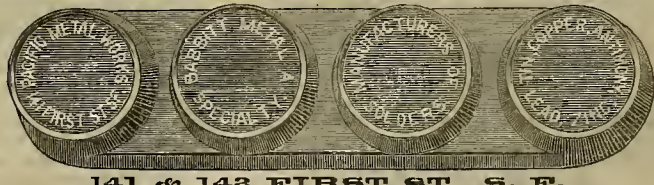
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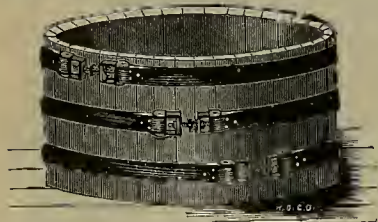
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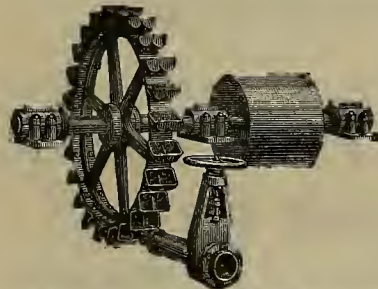


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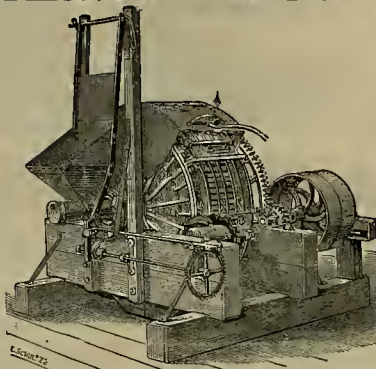
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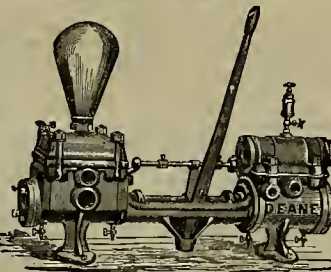
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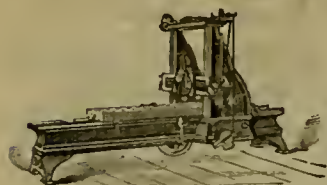
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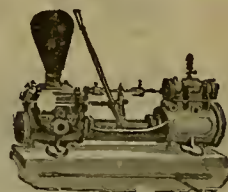


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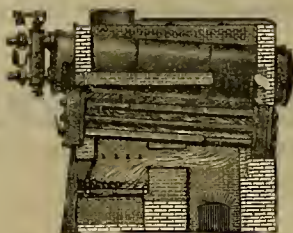
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MADE ENTIRELY OF BAR STEEL. Six Sizes; adapted for Pipe from 1 to 14 inches diameter.

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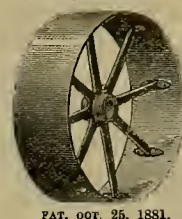
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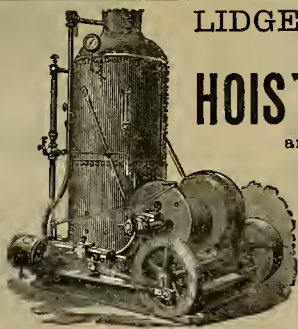
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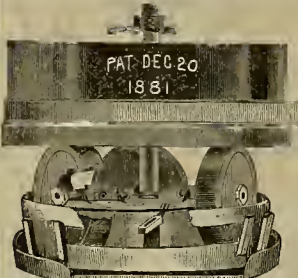
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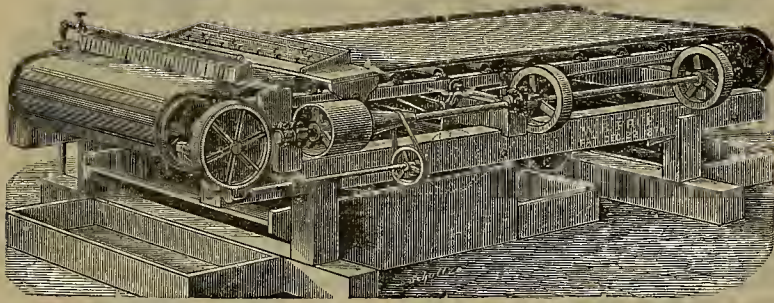
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THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

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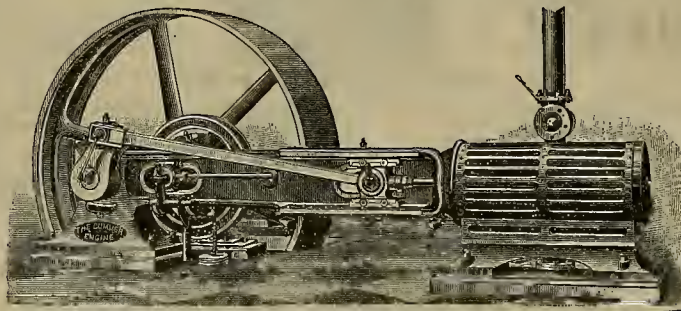
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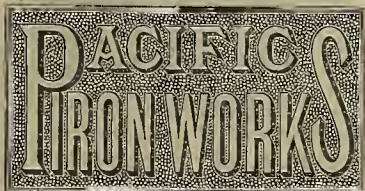
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
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SAN FRANCISCO, SATURDAY, JUNE 18, 1887.

VOLUME LIV
Number 25.

Manufacture of Sulphuric Acid.

Description of an Improved Apparatus.

Large quantities of sulphuric acid are made in California, and used all over the coast. It is interesting to note the various experiments and changes in apparatus, made use of during the struggle for supremacy among the alkali manufacturers of Europe. We are indebted to them for perfected chemical plants of all descriptions, and in connection with the manufacture of acids, we are indebted deeply for their utilization of sulphur in ores, with consequent increase in mining industries and material lowering of price of brimstone. The production of sulphuric acid was their fundamental process; and active competition in trade, together with the passage of laws to compel the saving of gases, or to render them less destructive when issuing from chimneys, brought into use apparatus for the absorption of nitrogen compounds.

At a recent meeting of the American Institute of Mining Engineers, W. H. Adams, M. E. of New York, read a paper on "An Improvement in Apparatus for the Manufacture of Sulphuric Acid," in which he describes the Gay-Lussac absorbing tower for nitrous gases, the Glover tower for denitrating nitrous vitriol, and suggests certain plans and modifications himself. This paper is of great interest to acid manufacturers, and we here reproduce it in part with the necessary engravings.

The Gay-Lussac Absorbing Tower for Nitrous Gas.

This was the outcome of experimenting in the direction just named, and has not been modified or changed materially up to the present day. "It consists

of a chamber at the end of a set of chambers, higher than wide (a 'tower' or 'column'), the walls being made of material capable of resisting sulphuric acid, and the interior space filled with a material presenting a large surface. By means of this 'packing' a stream of sulphuric acid entering the column from above is divided into small drops; at the same time the current of gas rising up in the tower is divided into many small jets; thus the contact between the gas and the acid covering the surface of the packing is multiplied.

"The principle employed here is exactly the same as had been employed for a long time in the 'scrubbers' of gas works, and is also applied to the condensation of muriatic acid in the decomposition of common salt, namely, to produce a great many points of contact between

and lined in a careful manner with bricks or tiles, which conform to and hold the lead in shape and place.

The interior space is filled closely to the brick lining with acid-resisting materials, or "packing," so placed that it divides the vitriol,

ties as will cool the incoming burner gases to the proper temperature for maximum chamber-working. These acids give up the major part of the water they may contain, and during such concentration also give up any nitrous compounds they may contain, which, with the sulphurous gas, steam, etc., pass into the chambers.

The concentrated acid (59°-60° Baume) overflows from the pan bottom, is cooled, stored and utilized for any of the ordinary purposes.

Theoretically, the working of the Glover tower and Gay-Lussac column in combination gives us the first rational process for the economical manufacture of sulphuric acid in a large way, and it may be said that neither principle of working is valuable without the other, nor can any works be said to be properly constructed without employing the principles of both.

Practically, however, the Glover tower has not been successful, except, as stated, in the larger and better works, where managers are employed whose skill commands success. In fact, the majority of works in this country employ neither the Gay-Lussac column nor its companion, the Glover tower, and such works are fast being relegated to the rear of the procession.

It is a matter of surprise that such valuable parts of a large process should be lacking at this late day. The principal difficulty encountered by those who have erected the Glover tower seems to have been the lack of an acid-resisting material to line the interior, a material which will withstand disintegration in contact with hot concentrated acids.

After expenditures of large sums of money during the past 20 years, in the trial of every known substance, nothing

has been found to answer all the requirements.

Until this year it may be said that no material or method of lining towers has given promise of withstanding the usual deterioration, and therefore the full measure of value and great utility of the Glover tower has not as yet been realized.

The question has often arisen as to the possibility of adopting other forms of plant and modifications in construction to accomplish the same

(Continued on page 397.)

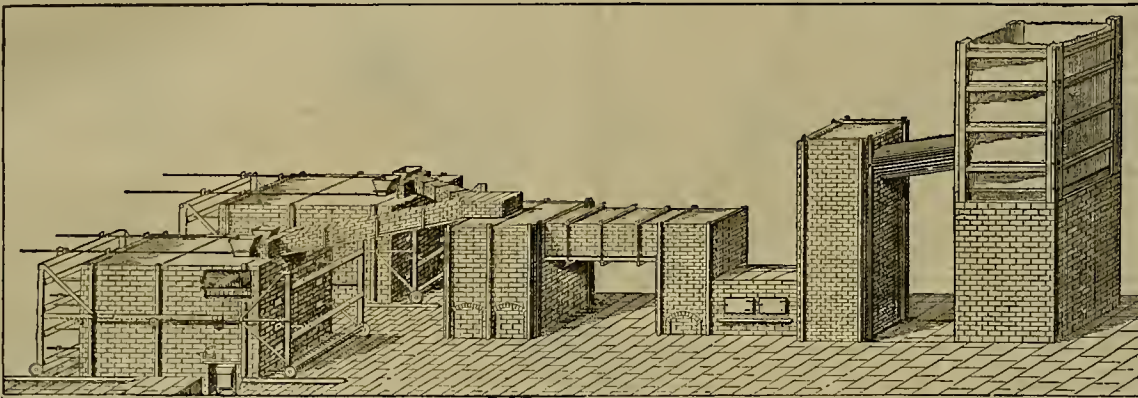


Fig. 1—AMERICAN-SPENCE FURNACE, SHOWING MECHANICAL PARTS, DUST FLUES, NITRE OVENS, ETC.

the gas and the absorbing agent. Or, the interior of the tower may be represented as a filter which allows only the inert gas to pass, but retains the gas acted upon by the absorbing agent."

The working of the tower consists in raising

entering at the top, into small streams or drops, thus presenting the greatest possible surface to the ascending hot gases from the burners.

The exterior is attached to and supported

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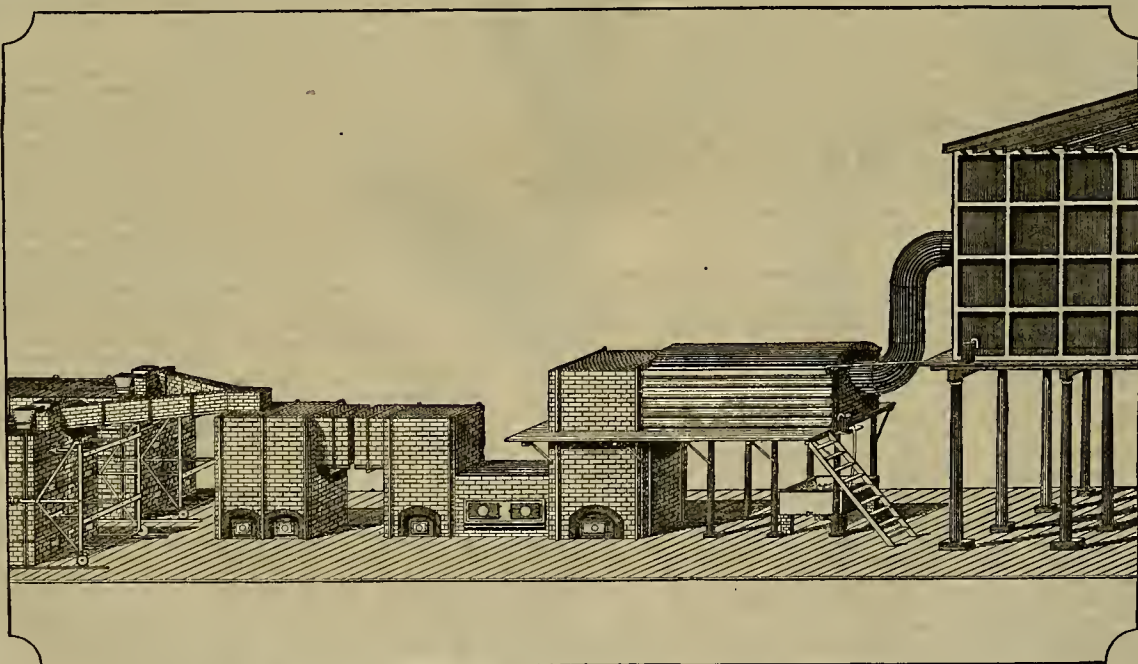


Fig. 2—AMERICAN-SPENCE FURNACE-CONNECTIONS, DUST FLUES, NITRE OVENS, DENITRATING FLUE, ETC.

sufficient quantities of cooled acid (density 60°-62° Baume) to storage tanks above the level of the top, whence it is regularly fed into the interior, absorbing various nitrogen compounds, and the resulting nitrous vitriol runs off at the base into proper storage tanks for use in the Glover tower.

The Glover Tower for Denitrating Nitrous Vitriol.

This consists of a chamber at the beginning of a set of chambers, higher than wide (a "tower"), having an outer casing of sheet-lead

by strong framework resting upon a solid base of masonry and securely placed to prevent settling. The base is usually at about the level of the chamber bottom, from 10 to 15 feet above the level of the ground, but should always be high enough to drain its pan acid into the first chamber.

The working of the tower consists in raising sufficient quantities of acids, from any source or of any density, into storage-tanks above the top of the tower, and in feeding them into the interior in such a manner and in such quanti-

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

The Cœur d'Alene Mines.

(Concluded from our last.)

(From our Correspondent, R. G. HUSTON.)

Murray I found but little changed from what it was when I was here in October, 1885. There is not now so much of the loose-floating population as was the case then; but as these people are not often producers, the sooner a camp gives them the shake the better it is for all concerned. If a man does not produce anything in a new mining camp, he is a leech on the generosity of his friends, and if he has none of them, he has to get his living from anybody he can.

The placer mines, the origin of the Cœur d'Alene excitement of the winter of '83 and '84, On Pritchard Creek,

Were never of the magnitude reported on the start. But who ever knew of a camp that did come up to the wild visions of the persistent stamper who always has his blankets rolled, ready to take the hurricane deck of his cayuse and strike for a trail to new diggings. His happiness consists usually in the anticipation, as, when he arrives in the vicinity, he many times pronounces judgment on the country before he alights from his horse.

But Pritchard creek in the main bed has, with few exceptions, never paid much, most of the pay being in side gulches and bars. There is a very heavy deposit running through the high bare back of town and crossing all the different side gulches that put into Pritchard from the north side. They call this the Old Wash. The general opinion is that it is an old river-bed. This is the most extensive deposit of that character in the country, also the richest. The only reason that it is not at the present time producing a large amount of the precious is the lack of water to work it.

There is a ditch started from the main creek by some parties who have fallen by the wayside for want of capital, and, of course, they still hold their right to the water, until some one with money gets in and buys them out, or else furnishes capital to finish the ditch. This part of Murray's substantial support will remain *in statu quo*. There is a ditch which covers the lower part of the bar, and whenever they do have water have good pay. W. J. Hawkins is now operating his claim, and is taking out good money.

The Old Bedrock Flume Pool.

A bubble that was flying so high when I was here before, has been defunct for a long time. The Colorado and Eastern capital behind it failed to "ante" enough funds to start it in proper shape, and, as a matter of course, it had to succumb. Many of the local residents think it will be resurrected and made a success in time. However, with all the disappointments this camp has, I think there is a bright future for it yet. The development may be slow, but it surely will come. One quartz-mill, the old Golden Chest, has been running almost constantly since they first started. When I was in, it had just shut down to make some needed repairs, but will soon be at work again.

The Idaho Mill

Property will soon be at work again. They have expended over \$230,000 already on mine and improvements. The president of the company was on his way in to the works when I was coming out, and on his decision will depend the future of this property. If he decides to go to work in about 60 days, they can be dropping stamps. The Golden King mill, down below Murray, is in working order, but through a change in management is now shut down.

History repeats itself in regard to new mining camps and

Inexperienced Eastern Companies.

They buy a prospect and without developing the fact whether they have a mine or not, go to work and invest a large sum of money in a milling plant, which, in the first place, they do not know to a moral certainty they want. In the second place they invariably try to make themselves believe that their ore is free milling. This is to save some further expense, and the chances are strong that in nine cases out of ten they are here pursuing the "penny-wise plan," as the majority of the ores in the vicinity will require roasting to save a fair percentage of their value.

The Mother Lode

Owners are now operating their mine with an arrastra and are getting good returns for their work. The ore runs from \$50 to \$80 per ton. Although they do not work it very fast, their expense account is small and they are making money.

This is the property that created quite an excitement at the time of the discovery, when they uncovered a slab of almost fabulous richness. This, the company still preserve intact, but at the time of my visit it was under water, as the waters in the creek were very high.

A little way further up the mountain is the Occident and the Treasure Box. The latter has made quite a record this winter, the owners

having pounded out with a band mortar over \$15,000. They took out \$32,000 from one set of six-foot timbers. This, of course, was extra choice. Their ordinary ore runs through an arrastra averages from \$60 to \$75 per ton. This property is owned by the Williams Bros., Frank Chase and Anson Holmes. This season's work will, no doubt, give the boys a good home-stake and develop their property to its legitimate value.

The Occident is located between the Mother and Treasure Box. They also have an arrastra and are getting good results from what ore they work. The mine is owned by Stevens Bros., Tinker, Joe Taylor and McAnter.

The Buckeye Boy is below Murray about one and a half miles, in Dream gulch. It is owned by Frank Reed and Messrs. Scowden & Sheppard, of Louisville. A large amount of development work has here been done, and ore is in sight all around, although the development is not done in the shape to admit of an expert measuring up ore satisfactorily. There is plenty of ore in sight, and what has been worked in an arrastra down on Pritchard creek run \$32 per ton. The tailings from it assayed so high to the ton that it was a waste of good material to do much more in that line. Frank will be able one of these days to attract some capitalist to his mine and make a sale, and when he does look out for another heavy yielding gold mine. There is a

Number of Fine Prospects

On the old Belknap trail. These carry a heavy percentage of lead and a fair amount of silver. One of these, the Cresue, is about 10 miles from Murray, and is owned by H. L. Frank, of Butte, J. K. Waite, W. L. Blossom and J. S. Bennington. They have 720 feet of tunnels run at four different points on the vein. Samples run from 50 to 70 per cent lead and 15 to 500 ounces of silver per ton. These parties were about letting another contract for running another 100 feet of tunnel, and with their present showing will no doubt then build a road to the N. P. R. R., as they are only eight miles from it. That will at once give them access to reduction works, and then they can soon ascertain what the value of their property is. There are many other properties that have more or less work done on, according to ability of the holders, and many of them will prove to be good when they have acquired facilities for handling the ores properly.

At Murray.

Murray's business men are all in good spirits and are all carrying fair stocks of goods and speak with the utmost confidence of the future of their town. They have two good hotels—the Palace, kept by H. McCorkindale, the Louisville by Bennington & Darling—and the usual number of restaurants and saloons. The Cœur d'Alene *Sun*, owned by Adam Aulbach, an old San Franciscan, is a sprightly little daily, and with our old-time theatrical manager, Jack Langrishe, in the editorial chair, the *Sun* can never lack for news. The Cœur d'Alene *Record* is a tri-weekly, and is a creditable sheet for a new country. The paper is fully alive to the interests of the region and will see that they are properly laid before the public. From Murray to Thompson Falls it is 30 miles, and the fact that it has been giving us a warm rain every day for a week and ten feet of snow on the range to cross makes it quite a pleasant trip in anticipation. However, we made it through, although our bridge was washed away and we had to leave the coach and take to the hills horseback. This, without saddles, made the trip a funny one; but to use the jargon of this country, "we got there, Eli," late in the evening and tired out.

Thompson Falls

Is the main shipping point for Murray, and no doubt will be for some time to come. The town has quite a pleasant location just above the falls of that name on Clark's Fork of the Columbia. They were just having a meeting in regard to building trails into the new discoveries on Libby creek, a tributary of the Kootenai river. The mines here are found in a basin and bid fair to be extensive, but as far as I could learn not very rich, probably from \$2.50 to \$4 diggings. They are about 60 miles from Thompson Falls, and by building roads the merchants here can of course reduce the travel to come this way, all of which is of course very desirable to a point as dependent on outside supplies as Thompson.

They have also hopes of becoming quite a mining center, as the

Bell Mining Company

Is now operating with some 10 or 12 men on the Bell mine. This company was incorporated last year, but soon after that they were engaged in litigation, the circumstances of which I do not know, but this much I do know: it has retarded the development of the mine for some length of time.

They have shipped several carloads of ore from this mine, and the results have been very satisfactory, leaving a margin to the carload of from \$400 to \$700. This, with a quantity of ore and the convenience they have for shipping, as they are only five miles from the railroad up Thompson river, and no mountain to climb, makes it very easy to transport. Most of the Bell stock is held in Missoula by men of means. They are now operating with a view of systematically opening the property, and everything indicates that in the near future we will hear favorably from the Bell company of Thompson Falls.

Southern California.

[NO. 4.—CONTINUED.]

Editorial Correspondence.]

In continuing our notes upon Southern California, we now come to the extreme eastern portion of the great San Bernardino valley. At this point, and at an altitude of from 1600 to 1800 feet above the sea level, we find a plateau of some 10 or 12 square miles, which, for beauty of location and surroundings, fertility of soil, excellence of climate, facilities for irrigation, etc., cannot be excelled by any other locality in California. There are three centers of settlement near the central portion of this area, so near to each other that they must soon merge into one town or city. The several locations are now known as

Lugonia, Redlands and Crafton.

While this locality, taken as a whole, is unsurpassed in grandeur and beauty of prospect and scenery, it also possesses the most substantial elements of prosperity. The climate is that peculiar to the warm belt of the foothills in every portion of this and the neighboring valleys. The air is singularly dry, pure and salubrious, and especially adapted to persons suffering from pulmonary and nasal or throat complaints. As a place for home-seekers who desire a warm, dry climate, with plenty of water for irrigation and good drainage, by means of underground pipes, which preclude all possibility of malaria, it cannot be excelled. As an evidence of the healthfulness of the climate and locality it may be stated that the average of deaths here for several years has not exceeded 6 in 1000. This is only about one-third the average death rate of country places; and this, too, notwithstanding large numbers come here on account of ill health.

The Soil is a Rich Red Loam

From which the central locality—Redlands—takes its name. It is composed of vegetable mold and decomposed granite. Both climate and soil are peculiarly adapted to the culture of citrus fruits, while the deciduous fruits and vines also do equally well. In no other part of California or the world can better oranges be grown than upon the redlands of this locality. As an evidence of this, the fact may be cited that here and upon its counterpart at Riverside, seedlings almost invariably produce fruit of an especially delicious character. This locality is destined to become the garden of the State—the queen settlement of Southern California.

The Boom and its Progress.

The recent advent of the Atchison & Topeka railroad into and through the heart of Southern California, and the railroad competition thereby created, coupled with the unfortunate attacks of King Frost upon the orange groves of Florida, have gradually led to the getting up of numerous large excursion parties into that part of the State without the necessity of having to encounter the storms, snows and winter blockades of the Central route. These excursionists have seen and been charmed with the natural loveliness and climatic advantages of this truly wonderful portion of the Golden State. Nearly all who have made these trips are people of means, or invalids more or less well-to-do, who have become tired and disgusted with the winds and storms and snows of the Atlantic and Northern States, and have made the trip to escape for a season from the inclemencies of their Eastern climate. Under these circumstances large numbers have either settled at once or returned to the East merely to close up their business and return to make California their future home. The objective point of these excursions has generally been the city of Los Angeles, where thousands have purchased suburban homes in that vicinity or gone into business within the limits of that rapidly growing city. At first the overflow from Los Angeles was into Pasadena, one of the most favored localities in Southern California. Gradually, however, it was discovered that the farther back they went, up the San Gabriel valley, the better the climatic advantages. Riverside, with its vast spread of loveliness and floral and pomological beauty, attracted not a few. Ontario, Cucamonga and other places all along the beautiful San Gabriel valley, picked up many of the Eastern visitors and seekers for new homes. Still retreating up the valley in search of newer, and if possible, better resorts for health and other natural advantages, the tide finally found itself blocked by the grand old mountains which look down upon the San Bernardino and San Gabriel valleys.

This locality was, at the time of our visit, some two months ago, a great center of attraction. The hotels were filled with visitors in search of health or homes. Real estate agents were driving hither and yon, each with one or more at his elbow in search either of a home or a good field for investment. New streets and roads were being laid out in every direction. Houses of brick and wood were going up as fast as laborers could be found to build them. Scores of plows were to be seen everywhere breaking up new ground or cultivating old. Orange orchards and vineyards were being set out; the streets were crowded with teams, hauling building materials, household supplies, merchandise, etc.; and in some places quadrupled in

value within the past few months, was still going up; and everything betokened

A Busy Scene of Enterprise and Industry, Which indicated, in a most unmistakable manner, an early and prosperous future for the large and important town which must soon cover the present site of the three localities named. Spacious blocks and trade palaces may never be realized there, but lovely homes, elegant villas, crowded hostleries, beautiful parks, extensive streets and shaded avenues will soon cover many square miles of this portion of the San Bernardino valley. What the future name of the town may be is as yet undecided; but the feeling is continually growing stronger that some common name should be decided upon. If we were allowed to make a suggestion, we would submit that of Lugonia, which is already well known as the postoffice name. It is short, easily pronounced and spelled, euphonious, and has no similarity in sound to any other town or city on the Pacific Coast. Moreover, it is derived from the name of the first settler who obtained a grant of all this portion of the valley from the Mexican Government. Surely his name should be kept in remembrance, and what more appropriate way to do so than to affix it to the future city which is to grow up on the land which he was the first to cultivate and improve?

A steam or motor road has been projected to connect this locality with Colton and San Bernardino and the continental system of roads which concentrate there.

The Prospect House.

This is the only hotel now open in Redlands. It occupies a commanding site on the terrace which forms the eastern border of the settlement. The view from this house is magnificent. It is under the management of Dr. J. A. Mack, lately from Chicago, and is constantly full of boarders. It is one of the finest hotel sites in the valley, and will no doubt soon be greatly enlarged and improved in its architectural appearance.

Lugonia.

Which is located less than half a mile from Redlands center, is already rapidly growing in importance and population. A fine block of buildings is just being completed on the "Terrace," just opposite the postoffice, one portion of which will be occupied by the bank, and another portion by stores, offices, etc. All the land along the Terrace and the Sankey from this point to Dr. Stillman's vineyard—about one mile—has been laid out in lots for building purposes, with wide streets and avenues. The most of this land has been bonded to Mr. I. N. Hoag, formerly of Sacramento; at the time of our visit, he was making preparations to build a residence for himself upon one of the lots. Mr. Hoag has transplanted to his lot a large number of 8 or 10-year-old orange trees, which were taken up to make room for the bank building. They were all in full bloom at the time of removal, and at last accounts were doing well—not even losing the fruit which was just then setting. He will, no doubt, have the pleasure of surrounding his new home at once with a grove of bearing orange trees.

The Terrace Villa Hotel

Is a very handsome and highly ornamental structure, situated upon a slightly elevated terrace, near the center of the beautiful village of Lugonia. The view from every part of the house is both beautiful and grand. Lofty snow-capped mountains are seen at a distance upon three sides, with an open vista to the west, which looks for fully 60 miles down the San Gabriel valley. The hotel is located directly in the midst of an orange grove, with orange orchards and vineyards covering all the country around. It is also embowered in roses and flowering plants and shrubs of every variety. It is supplied with the purest mountain water and fitted up with every modern convenience. The table is supplied with the best of everything and elegantly served. The interior is roomy, well furnished, well ventilated and contains 45 rooms, 16 of which have been recently added to accommodate the rapidly increasing numbers of roomers and visitors. The dining-room of this hotel is one of the finest in Southern California. Mr. Frank Smith, the landlord, is well known throughout the central portions of the State as having formerly presided over the Piedmont house at Oakland and Highland springs in Lake county. The regular boarder or transient visitor will find in him a pleasant and accommodating landlord and a thorough gentleman, while Mrs. Smith is a host in herself—everywhere present, looking after everything in person from the kitchen to the parlor, making all her friends and guests completely at home in all their wants or pleasures. No pleasanter place for a visit or a domicile can be found in all Southern California. There is a good lively stable connected with the hotel, and nothing, in fact, is wanting to make it a most enjoyable place of resort at any season of the year, for here spring and summer are blended in ever and delightful presence from January till December.

W. B. E.

MINERS are "working" the black-sand deposits on the Watsonville beach, and are said to be making \$7 per day to the man. The sand is first "concentrated," and then shipped to San Francisco to be smelted. If they are making what they report, they are doing better than any other beach-sand miners have ever been able to accomplish for more than two consecutive days.

Geological Theories.

EDITORS PRESS:—With your kind permission, I will reply to a criticism from Mr. Storms which appears in your issue of May 28th. In the first place, I would remark that it was very kind of him to inform your readers what my true meaning was when I used the word "aqueous" in the article which he criticises. Hereafter, whenever you may favor me with space in your columns, and any of your readers should entertain a doubt as to the sense in which I have used any particular word, I suggest that they refer to Webster for an explanation, and form a conclusion in accordance with the definition he gives. In order to reply to Mr. Storms' strictures, I have need to restate here a portion of my former article: "They (the geologists) have assumed that granite is an igneous production—first formed of all the rocks—the backbone of the earth. Furthermore, that there have been deposited on the granite everywhere a uniform system of aqueous formations, numerous, distinct and identifiable, amounting in the aggregate to an average thickness of about 10 miles; therefore, when in any particular region the upper portion of the series, according to their classification, is wanting, in order to maintain their principles they resort to the expedient of assuming that the missing portions have been removed by denudation." Mr. Storms says that "if such theories are advanced they are certainly not from recognized authority."

I will show that in the foregoing quotation Mr. Storms has made a positive statement which cannot be sustained. The following quotation is from the Cyclopaedia Britannica, page 308, in the article on geology. "It was once a firmly held tenet that granite is the oldest of rocks, the foundation on which all other rocks have been laid down." I quote as follows from Le Conte's Elements of Geology, page 217: "Even geologists who believe that granite is the primitive rock have been compelled to admit that there is also a metamorphic granite, scarcely distinguishable from primitive granite. Not only gneiss, but even granite, is sometimes interstratified with unchanged fossiliferous rock." According to this view every portion of the earth's crust has been worked over and over again, passing through the several conditions of soil sediment, stratified rock, metamorphic rock, and igneous rock, perhaps many times in the course of the geological history of the earth, and we look in vain for the primitive rock of the earth's crust." We learn by the foregoing quotations that formerly all geologists regarded granite as the primitive rock. At the present time they are divided in opinion in consequence of granite having been found interstratified with unchanged fossiliferous rock, but those of them who doubt its primitive character still insist on the fact of its igneous origin. The inconsistency of the latter view must be apparent to any one familiar with the subject who is not geologically rut-bound; for it is impossible that any large molten mass could become interstratified with sandstone or any sedimentary formation without producing some obvious change in the subjacent rock at the point of contact. Concerning the thickness of stratified rocks, I quote from Dr. Buckland's "Bridgewater Treatise," Vol. I, page 39, as follows: "The aggregate of all the European stratified series may be considered to be at least ten miles," and on page 135 of Lyell's "Principles of Geology," Vol. I, there is a classified list of formations given, numbering 38. Mr. Storms says that at the time Darwin wrote concerning the large, denuded granitic area in South America, geology had not reached its present high standing. It may fairly be presumed that Darwin was at that time as competent to decide whether a rock was granite as the geologists of the present time are, notwithstanding the fact that Mr. Storms gives it as his opinion that the rock referred to was of some other kind, though he says he never saw it himself. I do not regard this passage of Mr. Storms' article as being a very pointed refutation of any argument of mine. But Mr. Storms evades the strongest point made in my article which he criticises. I have need to repeat from it as follows: "But there is another fact not so conveniently adjustable to theory. There are found lying side by side in the same horizontal line the fossils of the extreme polar and tropical animals. I challenge any local savant to give a logical explanation of it in consonance with the principles of geology as now taught." I renew this challenge to Mr. Storms or others who may choose to take it up.

JUSTIN CHENOWETH.

San Francisco, June 6, 1887.

U. S. ASSAY OFFICE AT BOISE CITY.—For each month this year the receipts of gold bullion at the Government Assay Office, at Boise City, have been from three to five times greater than those of the corresponding months last year, the extraordinary inducements offered by the Government, and the satisfactory returns given by the U. S. Assay Office here, having turned the bullion to this office from mining districts never before reached. The receipts for May of this year were 5081 ounces of gold bullion valued at \$82,297.93, as against 1275 ounces, valued at \$20,669, for May of 1886.—*Idaho Statesman.*

Prospects in Arizona.

EDITORS PRESS:—The year 1887 finds Arizona moving along quietly but surely to success in all things. We have no big mining boom on deck, but go where you will in any mining camp, and you will find the boys busy taking out ore to ship, and all are feeling more cheerful. Mr. Cockburn and others are putting up sampling works in Prescott. The Denver smelting men have been here to secure the ore, and the railroads are trying to help the miners to get their ore where it can be reduced to bullion. There are several carloads awaiting to be sampled. The pack trains are coming down loaded with ore, from the mountains to the roads, where it is loaded on to freight wagons and brought to Prescott. The P. & A. C. R. R. will undoubtedly run on to Phoenix this



A NATIVE CALIFORNIA MEDICINAL PLANT—Grindella Robusta.

year. The Maricopa road is already completed to Temple and will soon be in Phoenix. The Silver Belt road is being pushed from Flagstaff to Globe. The Walnut Grove Water Storage and Hydraulic Mining Co. are hiring all the men they can get, working night and day. While Illinois and Ohio farmers are coming in buying ranches in the agricultural part of Arizona, bringing with them experience, push, energy, ingenuity, and money to fit up elegant homes, everybody is agitating the question of putting down artesian wells. The stockmen are securing better stock to breed from, while the horticulturist is putting out more trees and vines. It is no use to deny the fact that good grapes, figs, lemons and oranges do grow in Arizona, and all smaller fruits in abundance where water can be had; and all you have got to do is to go down after the water to secure to your heart's content all you want. Those that have gone into bee-keeping are doing well. I have eaten as fine honey made from the wild flowers of Arizona as can be had anywhere. Our ranchers ought to pay more attention to putting out flowering shrubs and vines, for they beautify home and are useful. It now seems to be a fact that the Colorado Canal Co. will be a success. If so, it will open up thousands of acres of land for settlement.

Grindella Robusta.

We give on this page a native California plant which is becoming quite famous for its medicinal virtues. We take the engraving and description from a very interesting contribution to systematic knowledge of our American medicinal plants made by Dr. George Vassy, botanist to the Department of Agriculture in Washington.

The *Grindella robusta*, or "gum plant," is an herbaceous perennial plant of the order Compositae, growing in California. It has an erect, leafy stem, one to two feet high, branching near the top, the branches terminating by a single compound head of flowers, somewhat resembling the flower-head of saffron, the body of which is about one inch across, with the narrow, strap-shaped yellow flowers spreading out

has some reputation in California as a medicinal plant, particularly as an antidote to the poisoning of the poison-oak, *Rhus lobata*. It has also within a few years past been introduced into medical practice for use in chills and other diseases. Upon the right of the engraving, at Fig. 1, is an enlarged disk-flower, showing the achenium surmounted by the rigid, awl-like pappus.

Mining.

Not many people realize that the intelligence and comfort of this world began with mining, that the intelligence and comfort of the world has expanded in the same ratio that mining and the use of metal have. When savage man built, by accident, a fire upon a bed of iron carbonates, and found, next morning, a substance harder than stone and yet malleable; when, from it, he pointed an arrow, he made the javelin of the Greeks, the heavy spears of the Romans, the steam engine and the steamship possible. Better still, he made it possible to clear the forests; to cultivate the soil and to make comfortable habitations for mankind. When he found gold and silver and learned something of their peculiar properties, of their indestructibility, their perfect ductility, their freedom from corrosion; their exact fitness as a measure of labor, and therefore as a measure of value, then the breath of life was breathed into the infant nostrils of trade, and all modern commerce was made possible. From those beginnings, the upward progress in the working and combining of the metals marks the upward progress of the world. The wooden stick gave way to the iron plow; the bark canoe gave way to the wooden ship, because men had tools to fashion it and bolts to hold it in place; houses appeared in lieu of the caves and the piles of stone that before had made the abodes of men; art was born, and, hand in hand with science, began the work of subduing the world. The conquest has been going on ever since, and it has rested more on mining than on all beside. The generous earth gives man bread to sustain his life, but within earth is held the material which makes man's work effective. The dull ore gives no sign as it is brought forth, but under hammer and fire it becomes transfigured. It materializes into chariots and ships; it turned the sun back in gold from the great temple at Jerusalem; it sparkles on the bosom of beauty; it commands man's best service, and its absence or abundance marks the ratio of civilization which any land possesses. It made old Rome glorious with temples and with power; as it grew scarce distress came and then ignorance and crime, and the world lay in the twilight of the Medieval ages until the discoveries in the New World fired anew the arteries of trade, and quickened the intelligence of men to once more renew their assaults upon barbarism. The discovery of gold in California gave to the nation in a single decade more advancement than four preceding decades had; the \$1,800,000,000 which in gold and silver has been added to the treasury of the nation since that discovery 38 years ago, has advanced the republic from the place of a dependent power, so far as material wealth was concerned, to the foremost place among the nations of the earth. The moving springs have been the miners' pick and drill and the miner behind them. Mining is the one business that creates money and carries forward the forces of the earth; and its results are more like God's work than any other known to man.—*Salt Lake Tribune.*

MINING ACCIDENT.—On Friday of last week, when miners were going on shift at the Sharon shaft at the Ohollar croppings, a cage on which were four men went to the bottom with a rush. All four were badly injured, and one of them so badly that he lived only a few hours. The men were Luke Quinlan, John McCabe, Michael McDonald and Richard Pascoe. The men went into the mine through a tunnel that connects with the shaft at a point 250 feet from its bottom. Finding a cage at the station in the south compartment of the shaft, the four men got aboard of it, intending to ring themselves down the shaft. No sooner had they hoisted the cage, however, than it began to descend, and soon was rushing down with great velocity. It went to the bottom 250 feet below where they hoisted. Richard Pascoe was killed by this accident, and the coroner's jury gave a verdict to the effect that his death was due "to the negligence of the engineer in charge, who carelessly unhitched the cage from the engine, thereby causing it to descend to the bottom of the shaft with such rapidity as to result in the death of Richard Pascoe."

THE HYDRAULIC ELEVATOR AT NORTH BLOOMFIELD.—The hydraulic elevator recently put up in the North Bloomfield mine is pronounced an assured success. By it the gravel is raised 85 feet through an inclined pipe, being forced by 1400 miners' inches of water under a pressure of 530 feet. This action completely disintegrates the clay and gravel, which are then washed through a flume laid with wooden blocks, in the usual manner, and the debris deposited on the washed-out bedrock in the mine. The water when it escapes from this carries off no debris to the rivers. This appears to offer a solution to the hydraulic mining companies who have at command a sufficient supply of water to use the elevators.



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SAN FRANCISCO:

Saturday Morning, June 18, 1887.

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Passing Events.

The completion of the mammoth hydraulic dock of the Union Iron Works, in this city, and the raising of the first vessel by it, which occurred this week, is an event of great importance. The dock is of new design and capable of raising vessels of the largest size.

In mining matters there is little new to report aside from what is given in our usual mining summary. Work is being vigorously prosecuted in all directions.

Arrangements are nearly completed for running the big stamp and pan mill of the Consolidated California and Virginia mine on the Comstock by water-power. The power is to be transmitted a very long distance by wire rope, the water-wheels being placed in the shaft.

The New Drydock.

The new drydock of the Union Iron Works was used for the first time this week. It was used, moreover, to lift the first steel steamer ever built on this coast—the Arago—built by the same works. The dock consists of a huge platform which is lifted by 36 hydraulic cylinders. The dock is 450 feet long and 66 feet wide, a size sufficient to take on the largest steamer which ever comes to this port.

It was designed by Geo. W. Dickie, the well-known mechanical engineer, and built under his supervision. The cost has been upward of \$400,000, but it is a most complete appliance which the Union Works, in view of their shipbuilding and ship-repair work, could scarcely

do without. Iron steamers and vessels can now be docked and have any repairs or alterations desirable made in every detail at the Union yard. It is not only a valuable adjunct to the Union Works, but of the greatest use to the owners of vessels. We reserve a detailed description until an engraving of the new drydock can be prepared.

Facts, Fancies and Fictions in Mining.

The aptness of the adage, "Every man to his trade," finds frequent illustration in much that is written on the subject of mining by persons little conversant with the business. A case in point is supplied by an article on the production of gold in North America, published in an English journal of high repute, called the *Nineteenth Century*. Describing the geographical position of the region in which the auriferous deposits occur, the author of this article remarks as follows: "The precious metal is to be found in that long double chain of mountains which extends between the coasts of the Atlantic and the plains of the center," the long double chain here alluded to being the Rocky mountains. Locating the principal goldfield of North America in the Rocky mountains, and placing these mountains "between the coasts of the Atlantic and the plains of the center," evinces a sad ignorance of both history and geography. The most of the gold obtained in this country came from the Pacific slope of the Sierra Nevada, a locality more than 1000 miles west of the Rocky mountains, which latter are situated, not between the Atlantic Coast and the great plains of the interior, but to the west of those plains.

Speaking of the amount of gold taken out in the several countries lying west of the Rocky mountains, the writer tells us that British Columbia produces annually about half a million sterling—\$2,500,000. The gold product of that Province was at the time the above article was written less than \$1,000,000, nor has it, for any year since, much exceeded three-quarters of a million, the figure for 1886 being \$742,845.

Pursuing the subject, this writer informs us that the States of Idaho, Montana, Oregon, and Washington yielded in 1870 about 1,000,000 sterling—\$5,000,000. The product of these countries (only one of which, Oregon, is a State) amounted for the year mentioned to \$18,000,000; this being the figure officially reported by Dr. Raymond, Congressional Commissioner of Statistics—local authorities having claimed somewhat more. Concerning Idaho, we have the assurance that in 1880 she distinguished herself by the royal output of \$510,546; though Burchard, Director of the Mint, says it was \$2,430,000, a statement amply corroborated by other authorities.

Touching the placer mines of California, our scribe holds forth in this wise: "After the year 1848 the washings of the river sands produced immense quantities of gold; now only the Chinese find this efficient to procure them subsistence." By "the river sands" the man means, of course, our auriferous deposits known as surface placers, of whatever kind.

In some editorial remarks on this subject published in the last issue of the PRESS, we make the statement that there are employed in this class of diggings between 8000 and 10,000 men, all of whom, working only a portion of the time, make fair, and many of them large wages. Never in the history of the State has the number of men so employed been less than it is at present; the prospect now being that it will for some years to come be materially increased. Instead of "the superficial washings" having been long ago exhausted, as this writer affirms, they have shown but little diminution for the last 25 years, the tendency of late being toward expansion, as in this recent editorial we have undertaken to show.

But if this party speaks so disparagingly of our placer mines, he makes ample amends when he comes to talk about our vein deposits, as witness the following touching the great dominating lode of the State: "The 'mother lode' commences in Mariposa and passes the limit of the State at the north, where it is covered by the lava of the powerful and as yet *unextinct* volcanoes, Pilot Peak and Lassen Peak." Translating this into intelligible language, our author would have the reader understand that what is known as the "mother lode" of California, commencing in Mariposa county, can be traced thence north 300 miles, where it disap-

pears, being covered up by the lava flow from two active volcanoes. If not quite correct, the above statement possesses at least the merit of novelty. So far as surface indications go, the presence of the lode here spoken of can be recognized for a linear distance of 25 or 30 miles, hardly more. We wish we had better authority for the statement that it can be identified all the way north to Oregon. In claiming for our State all manner of prodigies, we Californians have never been accused of an excess of modesty, but really we have not the cheek to claim for our "mother lode" anything like the length here assigned it.

From the passage above quoted, one would be led to infer that Pilot Peak and Lassen's Peak were situated beyond the California line, whereas they stand a long way to the south of it. If these peaks are *unextinct* volcanoes, as this writer tells us, this again will be news to most Californians. It will not be denied that we have long felt the want of a lava-spouting mountain in this State, the more frequent and violent its eruptions the better. To think that they should have these both to the north and the south of us, and yet never a one in a country that can boast of the *Sequoiu gigantea* and the Yosemite! Even the clouded Kanaka, pointing to the ever-seething crater of Mauna Loa, has been able to deride us! Our humiliation is profound! We are consumed with envy. But let us take courage. If the word of this English writer may be trusted, we have no less than two powerful volcanoes in our midst, both "going concerns." If not belching forth flames just at present, they are, to say the least, *unextinct*. Moreover, there is a tradition that one of these has been seen to smoke. If this habit is as little curable with mountains as with men, there is reason to hope that the tall cone that commemorates the name of Peter Lassen will some day indulge in another good puff and possibly a prolonged smoke, thus adding another wonder to the scenic attractions of California.

Passing over into the Sagebrush State, we learn, through this contributor to the *Nineteenth Century*, that the Virginia range in which the Comstock lode occurs runs parallel with and to the west of the Sierra Nevada. Nature having located the above range to the east of the Sierra Nevada, it is likely to stay there, despite the change here attempted in the topography of the country. In regard to the finding of the great Washoe lode, our author falls into several errors: Henry Comstock was not its discoverer, nor did this event happen in 1869. It was discovered by other parties, and in the year 1858. But now we have two consecutive facts correctly stated: Henry Comstock did sell his claim and afterward commit suicide. This achieved, the writer relapses into his old habit of romancing, going on to inform the reader that of the entire stock of gold in the world, North America has contributed £14,000,000—\$70,000,000. The sum so contributed amounts to very nearly a billion dollars. Being an Englishman, the writer may be excused for expressing the opinion that the country north of the Rocky mountains—to wit, British Columbia—is where we are to look for happy discoveries of gold in the future. Whether or not this shall prove to be the case, certain it is, no country on earth stands more in need of such discovery than that forlorn and dismal region.

Truly, the man who knows nothing about mines and mining had better leave their discussion to others. But, so it is, the task that we mortals are least fitted to perform is the one we are often most anxious to undertake. We have known miners who would persist in dabbling in literature or engaging in other pursuits for which they had no fitness, though their efforts earned for them nothing but ridicule. How signal would be our failure should we essay the work of the writer here criticised, supposing him to be a harber, for instance. Wrestling with mining facts we feel somewhat at home; contending for eupremacy in the art of tomorial an ignominious defeat awaits us. Again we say, "Every man to his trade."

STATE MINERALOGIST IRELAN and Professor Jackson of the University of California are about to examine the numerous specimens of bituminous rock recently sent to the bureau from Alameda, San Mateo, Contra Costa and other counties. It is expected that this rock may be valuable for paving purposes.

An Improved Headlight.

In the usual construction and use of headlights for locomotive they are fixed to the front of the engine so that the light is always thrown forward and concentrated in one line. This shows the track clearly enough when the line is straight, but if there are sharp curves, the line of direction will throw the light outside of the line of the rails within a few yards in some cases, and leave the line of the track or the inner line or embankment of the curve in comparative darkness. To overcome this difficulty, Dr. William Dutch, of this city, has just patented, through the MINING AND SCIENTIFIC PRESS patent agency, a headlight with an adjustment which will allow the engineer to direct the light to various points off the line. The lantern is supported on a frame or platform which has a movement to right or left about a vertical axis, and up and down about a horizontal axis. The operating mechanism leads back to the cab so as to be in handy reach of the engineer.

By the arrangement patented the engineer is enabled to examine dangerous or doubtful parts of the road, and in stormy weather to turn the light upon threatening trees or masses of earth or rock upon either side which may be in danger of falling, so that if they appear in a dangerous condition he may instantly check his speed or stop. The device also enables him to turn the lantern so as to throw the light across sharp corners and examine the line of track at some distance ahead of the train and at points which would be entirely out of reach of the light in its usual fixed position.

It will be manifest that a lantern or headlight having a similar adjusting mechanism may be mounted on a vessel and would be of great advantage when running in crowded harbors or channels, or in making landings at wharves or docks, as the light could be turned to either side and collisions or accidents be avoided. This mechanism may also be employed for other similar purposes—as in hydraulic mining claims which are to be worked at night and when different portions are to be examined. Some of these lights are now being manufactured in this city.

Air Locomotive for Mine Work.

We saw at the Phoenix Iron Works, this week, a pneumatic locomotive and plant, which is shortly to be put in operation at the great gold mine at Douglas Island, Alaska. The engine is intended to haul cars of ore from the tunnel to the mill, a trip of about 1600 feet.

The compressor and the locomotive are of new design. The ram or compressor is a quadruplex five by eight and compresses the air to 200 pounds pressure, which is the working pressure. This compressor will be set up next to the rock-breaker at the mill, and will be run by belt from the rock-breaker shaft. A pipe will lead from the compressor to a large reservoir or tank, which will be placed alongside the grizzlies at the end of the mill. The tank is 30 inches by 12 feet. The pressure of 300 in this gives 200 pounds pressure on the engine-tank. The engine will run down to the receiver for its supply of air each trip, the trips being made every 15 minutes.

The locomotive is very compactly built and is of neat design. It is 8 feet long over all and 36 inches wide. The height is 4 feet 6 inches. The tank of the engine is 26 inches by 5 feet. The cylinders are 4x10; drivers, 24 inches. The engine is arranged with reducing valve to average about 35 pounds working pressure. It is calculated to haul 5 tons of ore on a half-per-cent grade, at the rate of 800 feet per minute.

Although pneumatic engines are, of course, well known, it is a new scheme to use them underground on this coast. The whole plant was designed by Rix & Firth, of the Phoenix Works. The engine was tested at the shop this week. The engine-tank fills in about four seconds. The design and work reflect credit on the builders, who have succeeded in getting up a compact locomotive for mining work, which it is hoped will be followed by many others for a similar purpose.

THE forty-eighth meeting of the American Institute of Mining Engineers will be held in Utah and Montana, beginning at Salt Lake City on Wednesday evening, July 6th.

Wallapai District, Arizona.

We had a conversation this week with Mr. Wm. Larkin, assistant postmaster at Kingman, Arizona, who is on a visit to this city. He exhibited to us a number of specimens of ore from the mines of Mohave county, and from him we gained some facts of interest regarding mining matters in that region. Mohave county, which embraces the northwestern portion of Arizona, is possessed of some rich and valuable mines, and the attention of capitalists and mining men is now being turned in that direction. Kingman, the county seat, is now enjoying a building boom. The country is beginning to be developed in earnest since the railroad came in. There are about 600 men in Wallapai district. There are sampling works at Kingman, where the ore are sampled, and then shipped to Pueblo, Colo., to be worked. The works crush about 400 tons of ore a week. There is also talk of putting up reduction works at Todd Basin, where there is a large body of low-grade ore, which will scarcely bear shipment. Kingman is now one of the most important towns on the line of the A. & P. R. R. between San Bernardino on the west and Albuquerque on the east.

A number of important mining deals have taken place in the region within the past year, all of which have turned out profitably to the buyers. The Prince George mine, located at Stockton Hill, was purchased by L. P. Drexler, G. H. Dana and M. D. Howell, all of this city, the purchase price being taken out in less than 30 days. The purchase of the C. O. D. mine, at a very high figure, by the same parties, even proved much more profitable than the Prince George. The owners, being well pleased, are now looking for other mining properties and have the purchase of some under consideration. Another important sale which was closed a few days ago was that of the Flores mine to an Eastern company by H. Raymond and J. M. Murphy, they receiving a fabulous sum for their property. We also note the recording a few days ago of the Gray Bros. property, sold to an Eastern company. A half interest in the Rural mine, situated at Mineral Park, was sold a few months ago, and double the purchase price has been taken out since. This mine has produced some of the finest specimens ever taken out of a mine, lumps of wire silver being found in abundance. Some threads of the wire silver are as fine as silk, while others are one-fourth inch in diameter; but the most valuable and best-developed mine in the county is the American Flag, at Wallapai mountains, owned by Richards, Corin & Co. The ore taken out is of a very high grade of ruby and antimonial silver, and will rank with ore taken from any mine in Arizona. A very rich strike was made a few days ago in the Cupel mine, at Stockton Hill, owned by Spruance, Stanley & Co., of this city, and under the supervision of Jno. Mackenzie. The Little Chief, Keyetone, Rainbow, Monarch, Dean, and many others, are valuable properties, and would be good prospects for any company to take hold of.

The deepest workings in the district are 200 feet. The best-developed mine in the county is the American Flag, where they have about six miles of tunnels, drifts, etc. It is owned by Richards, Corin & Pembertbey.

The Reno reduction works are kept constantly going, and it is now certain that the capacity of the establishment will have to be increased or other works of that kind erected if business continues to increase. They are now receiving ore from California and all portions of Nevada, and the returns have been so far entirely satisfactory.

ONE HUNDRED OUNCES of platinum has been received at Portland from Granite creek, British Columbia. With the exception of a few ounces from Southern Oregon, this is the first lot of platinum that has been received at Portland.

W. A. GOODYEAR is still in the southern counties examining petroleum and asphaltums.

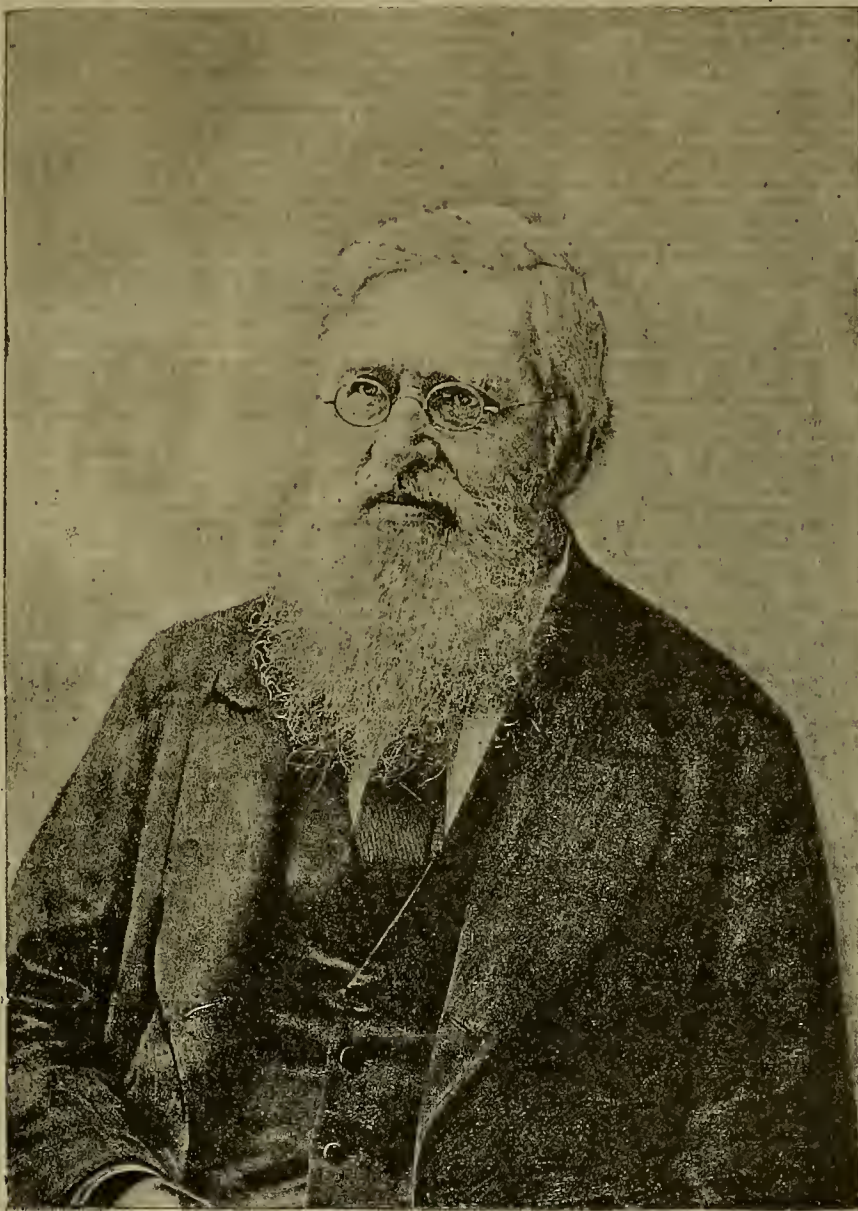
Foundry Notes.

Most of the foundries and machine-shops have considerable work on hand just at present. The largest number of men are at the Union Iron Works, where there are now 1100 at work in the various departments. Their shipbuilding and repair department is specially busy just now. They are at work on No. 6, to be christened the Victoria, a steel steamer, the hull of which is completed, and the upper works being put on. Her boilers and engines are ready for her. The steamer Al Ki is also at the docks of the Union to receive new engines. The Umatilla is being changed from a collier to a passenger ship, and her upper works are being put on. The Wilmington is being re-

Alfred Russell Wallace.

One of the most distinguished scientific men of the age—Dr. Alfred Russell Wallace—has been for some weeks on a visit to San Francisco. While here he has delivered several lectures on Darwinism before those of our citizens interested in scientific research. We give on this page an engraving of Dr. Wallace, from a recent photograph by Taber.

Dr. Wallace was born at Uck, in Monmouth, Jan. 8, 1822, and was educated as a surveyor and architect, a calling he exercised until 1845, when he devoted himself exclusively to naturalistic studies. He spent four years on the Amazon and eight years on the Malay archipelago, making extensive zoological collections.



ALFRED RUSSELL WALLACE.

paired and overhauled. The steamer Colima is having new boilers put in and being generally overhauled and altered. The iron ship Taemania is having the collision damage repaired. The steamer Arago is out on the new drydock being repaired. Work is vigorously prosecuted on the U. S. cruiser Charleston, the various portions being made, though the keel is not yet in position.

The rolling-mills are running full-banded. They are busy on considerable cable railroad work at present, having the iron and steel work of the Market-street extension and Powell-street road. The steel they are now making is exceptionally good, considerable of it being furnished to the Union Iron Works for their Government cruiser job.

The Fulton Foundry has several engines on hand for steam boilers for the coaling trade. They are putting new boilers in a large steamship, and have a good deal of miscellaneous work in the shops.

The Phoenix Iron Works have just completed a new style of air locomotive, with compressors, etc., for mine purposes, which is referred to more at length in another column.

It was while living in the East, without knowing of Darwin's cognate researches and speculations, that he wrote a theory of development by natural selection, though not using the latter term. He, therefore, really published the theory of evolution before Darwin. He has published many valuable scientific works. Among these are "Travels on the Amazon and Rio Negro," "Palm Trees of the Amazon," "The Malay Archipelago," "Contributions to the Theory of Natural Selection," "The Geographical Distribution of Animals" (which practically founded a new science), "Tropical Nature," etc. He has also written a work "On Miracles and Modern Spiritualism."

Dr. Wallace is a member of the Royal Society, and has long been distinguished in the scientific world. It was curious that both he and Darwin should have been pursuing the same line of investigation, which led to the same results, without either knowing of the other's work. The modern theory of evolution was therefore the result of the conclusions of two independent thinkers. As it bears Darwin's name, however, he is better known in connection with the subject than Dr. Wallace.

Manufacture of Sulphuric Acid.

(Continued from page 393.)

results; and I beg to lay before the Institute my suggestions in this direction.

Fig. 1 is a view in perspective of a plant largely used in this country for burning pyrites "emalls." The position of the flues, upright, downright and horizontal, is modified to suit the conditions of the various works to which I attach this plant. The illustration is introduced here to show a form of dust-catching flues and cooling flues which will be new to most engineers, but also, and principally, to show the ordinary position which the Glover tower occupies with relation to the remainder of the plant.

My suggestions refer to a novel construction of flue, or series of flues, connected to and made a part of the gas flue leading from the limestone furnace, or from pyrites kilns or furnaces. They are intended to be substituted for the Glover tower, and to accomplish the same results in the manufacture of sulphuric acid, being, however, applicable to any size of plant, and, at small cost, forming a new link in the chain of a perfected process.

Fig. 2 is a perspective view of a plant which burns pyrites "emalls," and shows the dust-catching flue, somewhat modified from Fig. 1.

This sketch embodies my suggestion in a general way as adapted to small works burning pyrites.

In place of the tower in Fig. 1, horizontal flues of convenient length and size are used, containing the necessary acid-resisting materials to accomplish the same general distribution and filtration of gases, and saturation with acids as in the Glover tower, making it in fact a tower laid on its side, and which is called

The Adams Denitrating Flue.

It consists of a leaden bottom, pan-shaped, which carries sufficient acid at all times to insure freedom from corrosion, and to act automatically as a controller of the speed of burner gases.

The pan is supported upon a suitable floor and columns, as shown, at such height as will allow the chamber acids to feed the filters automatically, and permit the cooling and storage of concentrated acids without cost of handling.

The sides and end are of lead burned to the pan. They are stayed by perforated cast-iron plates which retain the shape of the flue and form the support for the top. The dome or top of the flue is made of materials chosen according to conditions of use, and is removable at pleasure. The connections to the chambers are not shown in detail, but will be readily understood.

Inside the flue, acid-resisting materials are placed along the walls and backed by crushed coke, glass, etc., which is a cushion upon and protection for the leaden sheets, keeping them from contact with the filters, hot acids or gases. Inside the wall-protecting lining, a non-corrosive "packing" fills the flue from top to bottom.

The construction is such that burner gases of any known temperature can be put through the flue without damage to its parts, excess of heat automatically bringing an excess of acid to the filters.

With the aid of Fig. 2, this explanation will be sufficient to show the simplicity of construction, the adaptability to existing works, and the novelty of the suggestion as compared to anything heretofore devised. Some new ideas are worked out by which the control and utilization of the entire heat of the burner gases will materially reduce the present cost of acids, while assuring a constant operation of the plant.

The essential features in a radical change of this character are: 1. Absolute control of chamber-temperatures. 2. No excessive weight of lining, packing, etc.; no corrosion; therefore no extraordinary repairs or stoppages. 3. All the acids from the chambers are concentrated to 63°-64° Baume by heat of burner gases. 4. Small cost of construction and unlimited capacity. 5. Saving over one-half of pumping cost, etc., involved in the delivery of the acids to the top of towers.

MECHANICAL PROGRESS.

Progress of Mechanical Science.

The following is an abstract from an address delivered before the section of Mechanical Science of the American Association for the Advancement of Science, at its late meeting at Buffalo, by O. Chsnute, of Kansas City:

In marked contrast with the past, the present age is one of pronounced material development. Formerly the brightest and most gifted men devoted themselves to religion, philosophy, politics, exploration, art; but for the past hundred years the attention of leading men of the civilized world has been directed to increasing and cheapening those products which minister to the daily life and comfort of man. Farmers, mechanics and laborers live now more comfortably than did the middle classes of feudal times; the duration of human life has been materially lengthened, and all portions of society recognize the importance of further progress, and the advantage of organization and invention in securing it.

This era of material progress may be said to have commenced with the final perfecting of the steam engine, which, together with the various attendant machines, takes the place of hand and animal labor, which has increased and cheapened the production of the necessities and luxuries of life; and it has pushed the inventor and the engineer to the front rank in modern society. It may be useful to point out the absolute necessity of verbal and written intercourse between investigators and inventors, that the speculation and curiosity of the former may ripen into the effective invention of the latter. Nothing is more remarkable than the multitude of minds and facts which are required for the perfecting of even a simple machine, nor how little the last man need to add to complete the invention. Facts and natural laws, known for years as curiosities, are taken up by some inventor, who fails in the attempt to render them of practical use; then a second genius lays hold, and profiting by the mistakes of the first, produces, at great cost, a working machine. Then comes the successful man, who works out the final practical design, and whether making or losing a fortune, he yet permanently benefits mankind.

The faculties of invention and discovery are generally separate. One set of men observe facts and deduce laws therefrom; and another set endeavor to turn the results of this observation and deduction to practical account in the production of labor-saving appliances. These men should meet one another, and profit by the interchange of ideas.

The well-worn history of the steam engine gives us an invention which did not spring full-grown from the brain of the inventor. History informs us that it commenced to exist 2000 years ago, in the colipile of Hero of Alexandria. His treatise remained hidden until translated and printed in 1547; and then Branca, the Italian architect, constructed one for pounding drugs. Hero's book ran through eight editions in different languages, and attracted the attention of a French inventor, who tried vainly to raise water by steam pressure. Then came the Marquis of Worcester, who died a disappointed man, after expending £250,000. Then de Morland tried using steam in cylinders, instead of in contact with the water; Papin built a steam-boat, only to have it seized and destroyed while on its way to England, and he, too, died broken-hearted and poor; Savery went back to using the steam directly in contact with water; and finally Newcomen built an engine that worked; and between 1705 and 1753 quite a number were erected. These engines had a duty of only 5,500,000 foot-pounds per pound of coal, the improvements of James Watt, an instrument-maker, increasing the duty to 60,000,000.

Oxidizability of Iron.—Some researches of a valuable nature have been made by a French metallurgist into the comparative oxidizability of cast iron, steel and soft iron under the influence of moist air, sea-water and acidulated water. With moist air it was found that in 20 days the steel plates lost from three grams to four grams for every two square decimeters of surface; chrome steel rusted more, and tungsten steel less, than the ordinary carburized steel; cast iron lost only about half as much as steel, and epiegelisen less than gray iron. Sea-water dissolves iron rapidly, and acts upon it more powerfully than on steel.

CASTING STEEL SHIPS.—A correspondent of the *Scientific American*, after reading Sir Henry Bessemer's proposition to cast in position the whole face of a fort, suggests that the same practice might be applied to the hulls of large war vessels. He thinks there can be no insurmountable obstacles in the way, and the plant once established could be used for a hundred or more vessels, which, when cast, could be cleared and floated away to be finished, the molds replaced and another cast in the same molds.

TO MAKE A FLANGE JOINT that won't leak nor burn out on steam pipes, mix two parts white lead to one part red lead to a stiff putty; spread on the flange evenly, and cut a liner of gauze wire—like mosquito-net wire—and lay on to the putty, of course cutting out the proper holes; then bring the flanges "fair," put in the bolts and turn the nuts on evenly. For a permanent joint this is A1.

Our Look Manufactures.

The lock manufacturers of the United States have always led the way in that branch of the mechanic arts, and just now they are making their English cousins particularly uncomfortable. The English correspondent of the *American Manufacturer* says: A few days ago I paid a visit to one of the largest factories of rim locks for the Colonial and Canadian markets, and I was informed by one of the principals that through the increasing severity of American competition it is impossible to get orders to keep the machinery running. Yet our manufacturers had hoisted great things, only a little while back, of the success with which they were going to compete. And this was one of the very factories, at the lock-making town of Willenhall, near Wolverhampton, where that boasting had been the loudest. The marked contrast between the confidence expressed by the principal on a former occasion and his dejection at present struck me as a little singular. For reasons best known to the Willenhall makers themselves, they have abandoned their intention, of which I advised Pittsburg manufacturers some time ago, of sending out to the Australias and Canada ornamental cast-iron-cased rim locks. They are intending to compete with another article. This is a machine-pressed, steel-cased rim lock, nicely japanned, and which will suit either hand. To make the lock stronger than ordinarily, the fore end instead of being merely sheet iron will now be made in cast malleable iron and will lap over the lock case, giving it an eighth of an inch bearing all round.

Further Attempt to Recover the Australian Market.

Pittsburg's competition has become so serious a matter that Willenhall manufacturers are forced to hestir themselves with increased energy. They express a determination not to give up the markets easily. The capital which they have sunk in machine plants specially to meet the Colonial and Canadian needs, they are determined shall not be wasted without a struggle. To the English makers, the matter is one of life or death, for their works are only half employed. Resolved to ascertain more than they now know of the causes of American success, Messrs. H. & T. Vaughan, an important firm, have this week dispatched one of their members on an Australian tour.

Ascertaining Pittsburg's Trade Secrets.

The tour is to be an extended one—probably of a year—and the ground to be covered is Australia, New Zealand, Canada and Tasmania. It is sought to ascertain exactly what you are doing in pushing your goods, the reasons of your growing success, and of the preference for American over English locks, and to collect patterns of the Pittsburg styles that are favored by the consumers. Accompanying this will be a determined effort to push the claims of native manufacturers. Customers are to be visited, and are to be made personally acquainted with the capabilities of English makers, and with the exact patterns and prices we are prepared to supply in competition.

NUMBER OF TUBES IN A BOILER.—It has been repeatedly proven by experiment that there can be too many tubes in a boiler; that all that is necessary is sufficient tube area for draught, and this will be sufficient to transmit all the heat possible. The law governing this, that the greater the difference in temperature the more rapid the transmission of heat from one body to another, is imperative. Nearly one-half of all the steam made is generated right over the fire. The boiler shell is usually about one-eighth of the total heating surface, and yet it evaporates three-fourths of the water. By adding more tubes than is necessary for draught the extra tubes become choked with soot, interfere with circulation, occupy space that with profit could be filled with water, and also increase the height of water-level.

CHANGES IN GLASS.—When glass is new it undergoes a slow but certain change; it slowly contracts. This period of change occupies from 12 to 18 months. Thermometer tubes, which are made of thick glass, any change in which would seriously affect the instrument, have to be kept for two years to be "seasoned," where very accurate instruments are required.

TINNING CAST IRON.—Small cast-iron pieces can be tinned by first thoroughly cleaning the articles to be tinned, and immersed in a bath of one ounce cream of tartar, one ounce protochloride of tin and 10 parts of water. The bath should be kept at a temperature of 190° in a stone vessel. Pieces of zinc should be thrown into the bath.

SHARPENING STEELS for butchers' and table use are really files, with the teeth running lengthwise instead of diagonally across. The teeth are produced by means of a hardened knurl, the steel being revolved in a lathe. The result is a series of fine lines raised from the stock and running from tang to point.

MACHINE GUNS FOR ITALY.—The Pratt & Whitney Co., Hartford, is making 150 Gardner improved machine guns for the Italian Government. They have 525 men employed.

THE FIRST WRITER ON MECHANICS.—It is believed that Aristotle, who lived 330 years B. C., wrote the first work on mechanics.

SCIENTIFIC PROGRESS.

The Influence of the Combustion of Coal Upon Our Atmosphere.

We give the following as an abstract of a paper read by Dr. Clemens Winkler before the German Mining Engineers' Convention, held at Dresden Sept. 5, 1885:

A hundred years ago people were still in doubt whether atmospheric air is a mechanical mixture or a chemical combination of its chief elements, oxygen and nitrogen. The fact that the two gases could be so easily separated was in favor of its being a compound, while the extraordinary constancy of its proportional composition seemed to indicate a chemical combination. The interest taken in this problem ceased rapidly as soon as it was proven with certainty that the oxygen and nitrogen of the atmosphere exist beside each other in a free state, and that the extraordinary and never-subsiding motion of the aerical ocean, which is produced by the influence of the sunbeams, causes a constant and intimate mixture of its elements.

Later investigations proved that solar radiation, beside this merely mechanical influence, exercises also a chemical, or rather a chemico-physiological, influence to preserve the constancy of its mixture. It was further recognized at an early date that atmospheric air always and everywhere contains some carbonic acid. But its amount seemed to be too insignificant a share to be worth any attention; yet how enormous is the absolute magnitude which this small proportion of carbonic acid in the air constitutes, considering the great expanse of the atmosphere. This was not fully understood until man's horizon extended; until his perceptive faculty grew and his intellectual eye learned to comprise worlds; until he had succeeded in determining the weight of this our earth and its atmosphere. Then the imposing transmigration of carbon taking place in the atmosphere was recognized. It was stated that all carbonic acid which enters into the air by combustion, respiration, decay and otherwise, is converted under the influence of sunlight through the vegetable kingdom into organized carbon combinations, viz., into plants, and the liberated oxygen returns into the atmosphere. As this change takes place on a large scale, it is the chief condition of a constant composition of the atmospheric air. Thus the carbonic acid is prepared as food for the vegetable kingdom, and the aerical ocean serves as a storehouse, the stock of which by this unceasing exchange is kept at a constant level. Since our observations were recorded, which certainly is no longer than a few hundred years, the amount of carbonic acid in atmospheric air remained almost unchanged.

But geology tells us that there has been a period in which the atmosphere was more saturated. In their early era the temperature of our planet, being like that of a hothouse, produced a gigantic flora which later on in its decline formed the large coal deposits on earth. The same carbonic acid, which, in immemorial times, roared and stormed through the high calamities of the paleozoic era, sunk as a petrified vegetable organism into a long and death-like sleep awaiting a new resurrection in our days. It is the miner who awakens it to a new life which means a new chemical activity, and civilized mankind are hence engaged to restore it to the great circulation of nature. Thus the man of our country heats with the glow which was blazing down upon earth long before men were living on its surface, and it is this heat to which the present time owes the gigantic development by which it is characterized.

Compare conditions of to-day with those 50 years ago in countries where large industries exist, and you will be astonished at the change in such a short space of time. It is almost a superabundance of force in which humankind indulges, since we have succeeded in unlocking the coal treasures underground, and make them subservient to our wants. Man indeed fully understood how to put the talent in his trust on usury. On the one hand he is not free from the reproach of profusion, yet on the other he must be credited for having lifted himself, with the help of the black hound, to an intellectual height which never before was attained, not even in classical antiquity.

Our era is in the full sense of the word an era of combustion. Everywhere in places of industrial activity we see glowing hearths fed with fossil carbon; we meet with stationary, with movable and with floating chimneys which unceasingly send forth into the aerical ocean the gaseous products of combustion, viz., carbonic acid.

The quantum of carbonic acid which humankind at present produces by combustion, for either the procreation of heat or energy, or light or electricity, is extraordinary and greatly enhanced in comparison to former times. This is done to such an extent that we may ask whether a reintroduction of carbon, which has been latent for many geological periods into the circulation of the terrestrial interchange of matter, by the combustion of coal on so large a scale, may not possibly cause a change of our atmosphere so as to disturb its chemical equilibrium. We may decidedly answer this question in the negative.

The amount of carbon which is wrested from the interior of the earth by thousands of diligent hands, and by other thousands used for

combustion, is so exceedingly small as to dwindle away if compared to the gigantic stock contained in our terrestrial atmosphere. The difference is so insignificant—not over four one-hundredths of one per cent—that it could not be determined by the most minute methods of investigation.

From these and similar considerations we learn modesty when we compare human work to that of nature. Man's hand is too weak to interfere noticeably with the imposing mechanism of the cosmic gear. We work on a small scale, and too slowly to disturb the equilibrium of the proportions ruling on earth. This, our smallness, must not affect or oppress us. In spite of it our time is great—the greatest in which humankind has lived. We may indulge in comparisons like those we made, but an estimation of our works must be done according to human measure, for, after all, we are simply men.

NATURE'S MYSTERIOUS PROCESS.—Where the diamond comes from nobody knows. You can no more predict the existence of diamonds than you can the existence of genius, although, to be sure, all diamond-fields to a certain extent resemble each other; and all, borrowing as they do their light from the sun, are found only in warm climates. Nor can you tell where the diamond goes to on combustion. Burn it and it leaves no ash; the flame is exterior like that of cork, and when it has blazed itself out there remains not even so much as would dust the antennae of a butterfly. If a man has his mysteries, his strange conversions, his going in a siner, his coming out a saint, so, too, has nature. The philosopher's stone is formed of the vilest materials, and the chimney-sweep is covered with that which, under happier auspices, would be jewels. This mysterious process of crystallization places between two bodies of the same nature a greater difference than between bodies differently composed. And yet not so great a mystery, either, for every year a process is discovered for making diamonds—only somehow the diamonds are never made, or, at the best, so microscopic, and at such an enormous expense, that they are absolutely useless except to gum on cards at the British Museum. In France, they say, a solution of phosphorus in sulphur of carbon yields minute diamonds, but things are better managed there than here, as has long been admitted.

TRANSFORMING HEAT INTO ELECTRICITY.—The London *Iron Trade Exchange* announces that Herben Hurghausen and Nerust have discovered a direct mode of transforming heat into electricity. It consists in placing a thin slip of metal in a magnetic field and maintaining its two ends at different temperatures, when a difference of potential is found between the two opposite sides of the slip. The direction of the current is reversed by reversing the direction of the magnetic field. The effect is, however, very slight. With a square plate of bismuth, measuring five centimeters on each side and two millimeters thick, a field of force represented by 6000 C. G. S. units, and a difference of temperature caused by placing a mica plate against two sides of the bismuth, one dipping in cold water and the other heated by a gas flame, the resulting difference of a potential was only 0.00125 volts. With iron instead of bismuth, the current is in the reverse direction.

ALUMINIUM SILVER ALLOY.—Alloy with a small per cent of silver, aluminium loses much of its malleability, but with five per cent of silver it can be worked well and takes a more beautiful polish than the pure metal. With three per cent of silver it is very suitable for philosophical instruments, being harder and whiter than the pure metal, and is not tarnished even by sulphuretted hydrogen. With small amounts of silver it appears very suitable for scale beams, and is now frequently used for this purpose. The alloy containing five per cent of silver has often been suggested for coin of small denominations, as it is hard, bright, and retains its luster in handling.

ELECTRICITY.—The velocity of a current of dynamic electricity, on the best possible conductor, suspended in air in such a way as to avoid all loss of power, is said to be about 280,000 miles per second. The term "current," as applied to electricity, is purely conventional. It is assumed to flow from carbon to zinc—or its equivalent—on the outer circuit. Two or more electro magnets, when connected in the same circuit, do not give off as much power as the two would if used separately. Each magnet added to a circuit will reduce to a certain extent the strength of all which were previously placed in circuit.

LIGHTING CARS BY ELECTRICITY.—The Connecticut River railroad is experimenting with a system of lighting the cars by electricity generated by power taken from an axle of the baggage car. The difficulty in maintaining a uniform speed of the dynamo is sought to be overcome by a speed regulator. A sufficient amount of electricity is stored in each car to keep the lamps aglow during stops at stations, and the storage is replenished as soon as the train starts again. Automatic couplings are used and ten lights are to be set in each car and one on each platform.

A FOG MAP.—A map showing the distribution of fog on the various parts of the earth has just been published by Admiral T. de Bort. The observations upon which it is based were made at 1600 land and 112,000 marine stations.

ENGINEERING NOTES.

A NEW MOTOR FOR LIQUID FUEL OR TAR.—A series of costly experiments in the use of coal tar as a fuel, extending over a period of five years, has just been completed in England. The results are stated by the experimenter to be very remarkable. With a consumption of two gallons of common coal tar per hour, he obtains a motive power of 30 horses. He says this can be still further improved in his present engine, which is the second he has constructed for the purpose of these experiments; but it has been altered and reconstructed so frequently, and in many cases so hastily, that he does not consider it prudent to put the increased strains on the working parts, which would be necessary in getting the higher efficiency. Arrangements are being made for constructing engines with all the improvements in design suggested by experiments, but even if no further improvements were effected the working cost is a mere fraction of what is required for the steam engine, for, at the present price of tar, the cost of running is at the rate of one penny per hour for 20-horse power. Shale oil, crude petroleum, or the waste remaining after refining petroleum, are equally available with coal tar. The heat produced by the combustion of the liquid fuel is intercepted at every point so effectually that the naked hand can be held in the exhaust pipe without injury.

GREAT INTERNAL SHIP CANALS.—Paris and Manchester having both resolved on a ship canal, it now appears that Brussels is determined not to be behind, and therefore a proposal has been made to the municipality to construct a ship canal to the Scheldt, having a depth of 6½ meters, with quays sufficiently capacious to allow 20 ships of 2500 tons each to unload or load, and the whole is to be connected with the great Belgian line of railway. The scheme is a bold one, but the company who will undertake it—if it is carried out—is an English one, and the contractors and workers will, doubtless, be English too. While on this subject, we may mention that such another scheme is about to be attempted in South Russia, by the cutting of a canal across the isthmus of Perekop, to connect the Sea of Azov with the waters of the Black sea. By this plan a saving of 100 miles of very rough sailing will be effected, and more especially the dangerous passage of Kertch, which in winter is constantly closed by ice. It is supposed that the making of this canal will greatly improve the coal and salt trades of Donetz and Odessa, which alone, in a commercial point of view, is a matter of the highest importance.

CONNECTING THE MISSISSIPPI WITH THE LAKES.—Two influences just now tend to boom this very necessary work; the fact that we have no ship entrance to the lakes for war vessels and the interstate law. Both these influences promise to be of great assistance to Chicago in securing the passage through the Illinois Legislature of the Sewage and Ship Canal bill. Mercantile and manufacturing interests all over the State now recognize the importance of establishing a route for the passage of large vessels between the Mississippi river and Lake Michigan. So genuine are the people of Chicago over the passage of the bill and the consequent building of the waterway, that a company has already been organized to operate a line of steamers between Chicago and New Orleans. Orders will be given for the construction of its fleet as soon as it is certain that this canal will be opened.

THE RAILWAY BOOM.—The records of the *Railway Age* show that from January 1 to April 1 no less than 1040 miles of new main track were laid on 49 different lines in 25 of the States and Territories. This is a larger total than we have recorded for any previous year up to the same date, excepting in 1882, when the construction for the entire year reached the unprecedented total of 11,568 miles. The mileage already laid in the three most unfavorable months of the year is greater than that added in any one of several years during the history of this country, and is only 700 miles less than the total new construction in the year 1875. If the record of recent years forms a basis for estimate, the work of the first three months of the year would seem to indicate that the track-laying for the year 1887 will aggregate from 8000 to 10,000 miles.

THE UNDERGROUND TRAFFIC OF LONDON.—The people of London are whirled from one part of the British metropolis to another by underground railway trains, on which the fare varies from two to four cents. The greater proportion of the tickets are sold for two cents. The trains are run at intervals of from a minute to a minute and a half. Nobody has ever been killed on this underground road, although more than 80,000,000 passengers are carried over it in a year. This is rapid transit worth talking about and enjoying.

THE TAY BRIDGE.—The ninth of the large central spans for the Tay bridge has now been raised to its full height. There are only four more girders to raise to complete the bridge. The work is proceeding rapidly.

LOCOMOTIVE OUTPUT.—The output of the locomotive works of this country at present is estimated to number nearly 40 engines per week.

GOOD HEALTH.

The Alleged Cancer Cure.

What a Medical Man Thinks of It.

Our readers will recollect a well-written article on the alleged "Cancer Cure" which appeared in our "Health" column during the month of May under the signature of "Medico on the Wing." It will also be recollected that the writer in question, an English physician who has had 14 years' experience in the cancer ward of one of the largest hospitals in England, while stopping for a few days in this city, became much interested in the present "cancer discussion," and took an opportunity to call upon Mrs. Dr. Cook, 224 Post street, whose name is now for the first time mentioned in this paper. He also visited and personally examined and catechized several of her patients. He concluded his communication with the following emphatic words in regard to his investigation:

"I do not regret it. I have done it profitably. I have caught a glimpse of a light which I hope may finally burst into a vast and luminous orb. I am satisfied that the assumption of a great discovery in the treatment of cancer has the appearance of being well founded. I have seen what cannot be seen in any part of Europe or America. I believe it to be a triumph for humanity and science. In its presence I stand again in the cancer wards of the Old World, holding in my hand a promise of hope to the hopeless. The medical faculty of the Pacific Coast should at once give it countenance and a respectful hearing. To reject it is to betray a dogmatism, a jealousy and a disloyalty to science and humanity that borders on criminality."

Our correspondent has again been heard from, and once more speaks hopefully and emphatically upon the subject. This time he writes from Boston, from which city he is about to embark for England, whither he goes to once more resume his duties in the cancer ward—this time, however, with "a promise of hope to the hopeless," which he trusts will soon prove "a triumph for humanity and science." It will be observed that he proposes to return to this city at an early day, with the intention, in case the organized body of our own physicians continue regardless of their duty to humanity and science, to join in the efforts of the little band of five or six of his brethren who are already engaged therein, and help on with the investigation with a determination to probe the matter to the bottom and ascertain the true extent and value of the treatment, which, upon its face, looks so hopeful of complete success. We bespeak a careful perusal of the present letter:

BOSTON, May 28, 1887.

MR. EDITOR:—On the ground of explanation and of duty, I write you from this city. Circumstances over which I had no control caused me to suddenly leave San Francisco before the time I had appointed, and it is here, while waiting for the steamer for England, that I seize upon the opportunity to address you a few thoughts in connection with those I communicated some weeks since. As were the trophies of Miltiades to the hero of Salamis, so have been to me since my departure the apparent trophies won in your city for science and humanity in the cure of cancer. From the very first moment of an awakened interest on my part in the new treatment, I have not ceased to dwell on this recent burst of light on the horizon of medical science. Up to the time of my leaving San Francisco I was contemplating a second visit of investigation to the physician to whom belonged the honor of discovery of the alleged cure of the malignant tumor. I greatly regret my sudden departure. I had there met a subject under new conditions, that from my earliest professional experience had occupied my mind as scarcely any other subject of medical treatment had.

I presume the physician in question little thought that on or about the 5th of April last she was entertaining one, with her decisive answers and eccentric exhibits, who had spent many years in a European cancer ward, and who was even more interested, if possible, in her own work than she was herself. Her confidence and enthusiasm in the efficacy of her system of treatment was of that strong type which always accompanies a deep-rooted faith and a consciousness of success.

She was interesting. She spoke philosophically. The blood with her was the great eat of disease. To attack it was to attack the citadel of the cancerous tumor. In her brief but crisp dissertations upon the care of the blood in the treatment of malignant difficulties, I was reminded of the celebrated Boyle, who said: "To neglect the condition of the blood for that of the solids is like the vintner looking after the structure of the cask and forgetting the wine." Our standpoints of professional experience and emotions were, of course, quite different, and, as a consequence, our thoughts ran out in entirely different channels during our conference. She seemed to feel herself the bearer of glad tidings to the suffering and the hopeless, which added to the potency of her manner.

Her denunciations of the cruelties of surgery in the treatment of cancer caused the vital tide to almost rush back under my heart, recollecting as I did that, under cover of my diploma and the broad license of my profession, I had labored for 14 years as an active associate in

her words of "human butcher," in the vain attempt to ameliorate the condition of cancerous victims. I must confess that while standing in her presence, listening to the narration of her many successes, won without pain, and at the same moment allowing my mind to run back to the vivid and depressing scenes of agony and of blood, which, like so many ghastly figures, lie eternally imprinted upon the web of my own professional life, I felt not a little disturbed, and thought that after all I was, with all my cherished honors, no more, perhaps, in the cancer ward than a simple adept in the "art of mutilation."

Since then I have spent no little time in reflecting upon what I heard from the lips and saw at the hands of this earnest worker in the realm of medical science; and comparing this with the teachings of the schools, and the well-known results of the knife as a remedial agent in the cure of cancer, I have almost come to the belief with her that the use of this instrument in its treatment should be held as a criminal act in the eyes of the civil law. And why should it not when scarcely one—ah, me, not one!—in truth is cured in clearly defined cases.

What a subject for reflection to witness the surgeon coolly preparing to mutilate the person of the cancerous victim, when he knows with certainty that 99 out of every 100 must pass unscathed from his hands to the grave, and that too often much sooner than if left to the mercy of the disease.

Think of a surgeon after grasping with a nervous grip his ample fee of gold, severing with his knife from the body of a delicate woman an entire breast for simple inspection under the microscope that he may determine whether the organ was really affected with cancer or not. Strange as this may appear to the novice, it is, nevertheless, a fact of history distinguishing the profession not only in the city of San Francisco, but in some older centers of medical skill and science to be named. And is this quackery? To call it so would be vehemently resisted by both operator and school to which he may belong. The layman, however, of sound judgment could not only denominate it quackery, ignorance, brutal experiment, but an act of malpractice that should incarcerate the surgical charlatan in the State penitentiary for the balance of his natural life. Consideration for the suffering, a careful avoidance of all unnecessary pain and discomfort to the sick, is one of the sacred requisites of the calling of the physician; and he who disregards this discredits the profession, and yet how often is this to be found in the history of the medical practitioner. And now what are the logical conclusions to be drawn from the foregoing illustrations of an endless catalogue? Can it be that in cases of cancer particularly, gold is the inspiration of surgery; or is it fame, or is it to gratify a brutal instinct in the name of science? It certainly cannot be science, nor conscience, nor any sentiment that belongs to a human heart. The history of surgery furnishes abundant evidence that the knife in many instances is the one great means relied upon for professional distinction. Novalis said Spinoza was "intoxicated with God;" so it may be said of many surgeons, that they are drunk with the knife of mutilation, especially in the cure of cancer. I was informed, while in San Francisco, whether true or not, that a certain female practitioner in your city, taking her cue, seemingly, from the reckless surgery of battle-fields, was laboring to establish a great reputation through the use of the knife, when poultices or resolvers would much more accord with science and common sense.

But by what authority, it may be asked, do I assume to become a critic of the medical profession, and especially of cancer surgery? I answer, by authority of experience, science, and humanity. Paul, the fiery advocate of the Jewish hierarchy, was finally chosen of God to expose its errors and hypocrisy. Luther, a Romish priest, was the man best fitted to arraign the church for impeachment. The nihilist, feeling the iron hand of the Czar, can best lay bare the cruelties of despotism. Oliver Wendell Holmes, by virtue of his profession, was eminently qualified to arraign on the lecture platform the medical practitioner for nonprofessional practices. Dr. Faustus, by Goethe, says: "Thus with our hellish drugs, death's ceaseless fountains,

In these bright vales, o'er these green mountains,

Worse than the plague we raged!

I have myself to thousands poisons given, And heard their murderer praised as blessed of heaven,

Because with nature, strife he waged."

And having had myself, for 14 years, a cancer ward of one of the great hospitals of England, I feel that I am in no way guilty of egotism in condemning the use of the knife as a remedial agent in the cure of malignant tumors. I reverently wish to God that it use in my hands as a specific for cancer could be blotted from my professional record. Its memories are harrowing. Like some unseen but living thing, it is constantly filling my ears with the moans of the suffering, and my vision with the apparitions of blood and of human mutilation; and yet all this was done in the name of science! But surely science, as defined by the schools and applied to the treatment of cancers, needs a new and a more truthful rendering.

I hope to return to your city in the course of another year; then I shall endeavor to follow up my investigations in the line of cancer treatment to a satisfactory conclusion. In the meantime I hope for humanity's sake that the new treatment will have so far triumphed over error

and misrepresentation that all dogma and professional jealousy will have been buried in depths whose chambers shall be beyond the reach of the mighty trump of resurrection.

MEDICO ON THE WING.

USEFUL INFORMATION.

IMITATING LEATHER SURFACES.—By means of electricity the most attractive leather surfaces are now completely imitated. The leather which it is desired to imitate is first well cleaned and coated with graphite, as in electroplating a smaller article. It is then placed in a copper bath, the tank of which is large enough to easily receive a skin of any size. A dynamo-electric machine generating a powerful current furnishes the current. The copper is deposited upon the coated surface of the hide to the thickness of one-sixteenth to one-eighth of an inch. The plate thus formed reproduces, but reversed, every mark and minute vein of the leather, so that a print taken from it is an exact copy of the original in every detail.—*Unknown Source.*

COCOANUT CELLULOSE is a new substance, and if it possesses the quality claimed for it, England may go back to her wooden walls with safety and beat up her self-destructive rams for old iron. The patentees claim that a ship cannot be sunk by shot or shell if only she has taken the precaution of coming into the fight with this peculiar tissue as a great coat. When a shot, no matter what its dimensions, strikes the side of a frigate, the carpenter and his mates need not jump to cram in the old-time plugs, for the cellulose immediately closes, and a drop of water cannot enter.—*Baltimore American.*

TEMPERINO STEEL.—A practical writer says: When we were much younger than we are now and the zylonite clearing on top of our head hadn't acquired such heauteous proportions, we had to temper up a lot—yea, verily, many lots—of steel tools, and here's the "great secret" we used: We got a "clush-bucket" and washed it out clean, then weighed out one ounce corrosive sublimate, put in two handfuls common salt and stirred it up with two gallons rain-water, heated the tools in hot lead and hardened in this liquid and drew over a charcoal fire. A tool never broke.

DISINFECTING RAGS.—All rags sent to New York are disinfected in the following manner: The rags are arranged in bundles and placed in an impermeable receptacle, into which superheated steam is introduced (330° F.). In about five minutes the temperature of the bundles is so high that in two hours it does not fall below 100°. The experiments that have been made prove that this process destroys completely all germs contained in the rags, whereas sulphurous acid is not so successful.

WORK OF A PUMP.—The amount of water a pump will throw equals the displacement, i. e., the area of the plunger multiplied by its stroke in inches. Multiplied by its number of strokes per minute, this divided by 231 (cubic inches in a gallon) will give the duty in U. S. gallons, always presuming the water cylinder to be completely filled and emptied at each stroke, a condition that rarely occurs.

SODA AND POTASH SOAP.—The hard soda soaps are preferable to the soft potash soaps for toilet purposes. The quality of soaps depends upon the character of their constituents and the thoroughness of their saponification. Good soaps must not contain free alkali or any foreign irritating substance. The addition of moderate quantities of perfume does not materially change the quality.

LIGHT.—In transmitting light through glass, colored glass acts like a screen and sifts out and absorbs or reflects all the rays except those that will pass through it. Those that do pass are simply those which correspond to the color of the glass. The true color of a body that transmits colored light is the complement of the light which it transmits.

GREEN VARNISH FOR METALS.—For a green transparent varnish for metals, grind a small quantity of finely powdered chromate of potash (it requires the most elaborate grinding), add a sufficient quantity of copal varnish thinned with turpentine. The tone may be altered by adding more or less of one or the other ingredient.

GLOSSY INK.—Any common writing ink can be made glossy by adding to it a little gum arabic or white sugar. If the latter is used care must be had not to use too much sugar, else the mixture will be sticky when dry, and if too much of either gum or sugar is used the ink will become too thick to flow well.

TO KEEP BRASS BRIGHT.—To keep highly polished brass absolutely bright and free from tarnishing, thinly coat with a varnish of bleached shellac and alcohol.

GAS ROSIN.—You can make your own gas-fitter's cement thus: Melt up 4½ lbs. rosin, 1 lb. beeswax, and stir in 3 lbs. Venetian red; it will hold gas in.

SERPENT SKIN is coming into fashion as a covering for books.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

RICH ORE.—*Ledger*, June 11: On Saturday morning last a blast was put into the tunnel of the Valparaiso mine near Middle Bar, at a point where the seam of rich ore was known to exist, and five tons of fine rock was blown out by a single blast. The ore shows considerable free gold, and is plentifully freighted with that gold-bearing black metal peculiar to that district. A piece of quartz weighing 400 pounds was shipped to S. F. to parties interested in the bond. There is abundant reason for believing that the mine contains vast quantities of the same kind of rich ore. The Gold Mountain mine at Quartz Mountain is again under attachment. The North Star Improvement Company has levied assessment No. 1 of two cents per share. It is the intention to levy an assessment of a like amount every two months. Col. Robertson is getting some excellent ore from the Cleveland mine, a short distance above the Big Bar bridge, on the Amador side of the river. Dr. Boyser of San Francisco, who is one of the stockholders of the Kennedy mine, is fixing up an apparatus for the purpose of extracting the sulphurets and gold-bearing slime from the tailings. It is an entirely new process from those heretofore used in this county. The process was tested for the first time Thursday, and is said to work admirably. The contrivance is very simple, and involves little expense. Considerable gold escapes the Kennedy mill through the black slime, and this invention is intended to curtail the loss if possible.

FROM SUTTER CREEK.—*Cor. Ledger*, June 11: A noticeable change has taken place in mining affairs on Mahoney bill. The Mahoney mill has come to a standstill, and the Lincoln, which has been idle for a short time, was started up this week. Mr. Clavorn, as agent for the absent stockholders in Scotland, assumed the authority to give the Mahoney Company a lease of the water in the Lincoln ditch, which authority Mr. Stewart questioned. As soon as he was ready to use the water, Mr. Stewart applied to headquarters, with the result that the use of the water was restored to him. In this state of affairs it is uncertain when the Mahoney will be able to resume operations. They are still making excellent progress in draining the Wildman shaft; some days the water is lowered as much as 24 feet. Some timbers have been delivered at the mine this week. Donnelly & Howard have got a contract to put up hoisting works at Graniteville, Nevada county. The works are to be erected 400 feet underground.

Calaveras.

RICH ROCK.—*Chronicle*, June 11: We were shown some fine specimens of rock from the Quaker City mine near "the junction," one day this week. This mine had been idle many years, but upon the resumption of work a little while since it is developing some very flattering prospects.

ORE.—*Mountain Echo*, June 8: According to report a large body of good ore has been discovered in the Tozer mine in this town, and everything now indicates that this mine will soon become a paying property. The improved Low crusher is being used to reduce the ore. We were shown a specimen of quartz taken from the Johnson mine, situated near Albany Flat, which, to say the least, is exceedingly rich. The shaft is now only 20 feet deep, but the vein has developed into an apparently permanent ledge six feet in width. The ore shows free gold and contains a high grade of sulphurets.

Del Norte.

BEACH MINES.—*Record*, June 11: Almost ever since the settlement of this county it has been well known that the beach below town was rich gold-bearing sand. The first effort made to work it was, if we remember rightly, about the year 1857, but the effort, from the manner of working adopted, proved a failure. Here the matter rested for a few years, when some parties from Gold Beach came down and tried their system of working by using copper plates, which proved successful beyond their most sanguine expectations. Chas. Brown and Thos. Bisbee continued to work the beach sand for a number of years, taking out many thousands of dollars, but on account, we believe, of having some trouble about the title of the property, they abandoned their claims. They were satisfied, although they took out a great deal of money, that much of the very fine gold was lost, and since that time several patent machines have been brought to the place and a trial made with them, but all have proved unsuccessful. The trouble has always been that not enough sand could be run through these machines, even if all the gold was saved to make it pay. No doubt there is as much gold in the beach sand now as there was 30 years ago, as every tide washes up the gold-bearing sand; and if a machine could be invented that would save the gold and at the same time a large quantity of sand could be worked, it would be one of the best paying investments that we know of in this section of the country.

El Dorado.

HENRY'S DIGGINGS.—*Cor. Mountain Democrat*, June 11: Armstrong & Roberts report having in their tunnel some of the hardest rock in El Dorado county. Millgate and Tom Daley will again be with us soon, to resume work on their quartz mine. The Carrie Hale Company has plenty of water in its ditch, and is getting some good pay out of its claim. Mr. Alexander reports getting along well in the Crystal mine.

Nevada.

A RICH STRIKE.—*North San Juan Times*, June 11: At the Delhi mine, on Friday last, rock was struck that is estimated by quartz experts will mill \$20,000 per ton. Two blasts were made into the vein, or lode, and nearly a ton of rock was loosened, all of which is of this rich character. We saw a piece of the rock which weighed 2½ pounds, and in which quartz was the exception and gold the predominating commodity. We saw other pieces that were literally covered with fine gold, and we were assured that the pieces shown to us were taken from the mass hap-hazard. This rock was taken from the stoping between the 300 and 500 foot levels. This strike places the Delhi in the front rank of quartz mines in the State, and establishes its char-

acter beyond a doubt. In the month of April, the yield of gold was sufficient to pay all the expenses of working the mine and to pay a dividend of \$70,000 to the stockholders. The production for the month of May was \$27,200—nearly double that of April, and if the rich rock we have described holds out, the receipts for the month of June will be almost fabulous. The \$27,200 receipts of last month were obtained at an expense of only \$1400. That is about the average cost of running the mine for one month.

NEW QUARTZ LOCATION.—*Grass Valley Union*, June 11: John Riley, Henry Shoemaker, and three other young men have recently located a quartz lode to the southwest of the North Star mine, which was formerly prospected somewhat, but not to a great extent. They have let a contract to run a tunnel 100 feet on the ledge, which is now in some distance, and shows a vein from two to three feet in width, which has the same appearance as the North Star quartz. The boys are feeling very good over their prospects, and have had offers to purchase their interests at figures that would pay them well above their investment, but they are in no disposition to sell. They can avail themselves of the benefit of the water that is used at the North Star mine for any machinery they may require, as the location of the ledge is at a lower altitude.

Mono.

BENTON ITEMS.—*Cor. Inyo Register*, June 9: There are more men at work on Blind Spring hill, and more ore being taken out, than there has been for several years, and prospects are encouraging. Last week M. Harrington and James Hoskins shipped a carload of high-grade ore, and the week before John Kremkow and James McClure shipped a carload each. J. F. Milner has about 15 miners employed at the Borrasco, and has a large quantity of ore on hand at the mill. He expects to start up the mill in a short time for a profitable run. Cal. Joy, who has a lease of part of Tucker & Mitchell's mine, has taken out 25 or 30 tons of rich ore, and still has more in sight. Geo. Watterson was in town the other day. He says the prospects of his gold mine, near Long valley, are very promising.

Placer.

A BIG FIND.—*Placer Herald*, June 11: We learn from J. B. Hobson, who was in town Monday, that gravel has been struck in the Red Point mine about a mile above Damascus. This claim is owned by the Golden River Mining Co., C. F. Hoffman, superintendent. In August last they started their tunnel with Burleigh drills and have progressed with the work continuously since. When in 2200 feet they raised for the channel, and on the first of this month, when at a height of 105 feet from the tunnel, they cut through into black gravel, and are confident they have struck the same black or blue gravel channel that has proved so rich in the Damascus or Mountain Gate mine, and which they were running for. It has been a question as to whether the Damascus channel extended in the direction of the Red Point. The Golden River Company believed it did and put up their money to test their theory, and their success is not only a confirmation of their judgment, but it opens up what bids fair to become one of the great paying mines of the State. The same channel below them has yielded at the rate of about a million and a quarter dollars to the mile, and the Red Point claim covers about five miles of the channel. This development will give a new impetus to mining in that section, and prove a good thing for the county.

DAMASCUS.—*Placer Argus*, June 11: Good pay is again being taken out of the Mountain Gate mine. Twenty-seven men are now employed at the Pioneer ledge, in Black canyon, above Damascus. The blue lead has been reached at last in the Red Point mine, four miles above Damascus. The mine has been, for many months, bonded to the "Societe Anonyme," etc., commonly called the French company. Messrs. J. B. Hobson, G. W. Snyder and F. D. Adams are the owners of the mine.

Plumas.

CRESCENT HILL.—*Plumas National*: Frank Vere informs us that he commenced work again this week on the Crescent Hill mine, east of Clernont. Frank has been holding on to this claim for the last eight years. He has a tunnel in 450 feet through hard rock and has just struck gravel, with quite a flow of water, which is a sure indication that he is in the old channel. He deserves a fortune for his pluck and energy in pushing the work as he has, under adverse circumstances.

SPANISH RANCH.—*Cor. Plumas National*: Mining is carried on quite extensively in a small way. Hydraulic mining has been superseded by retroversion, and the ancient modes of mining are again in vogue. It is truly pitiable, in many cases, to see those old "Argonauts," now stiffened and crippled with rheumatism, standing all day, knee deep in the ground-sluice, picking down the banks, which, before injunctives were served, they washed with their small pipes in comparative dryness. These cases are truly illustrative of "man's inhumanity to man," add Utah.

CLIFTON DISTRICT.—*Salt Lake Tribune*, June 11: Clifton district, near Deep creek, Utah, has 18 claims recorded, in some of which Governor West and others in this city are interested. This district is new, having been lately organized. Messrs. Martin and Woodman have seven or eight claims here, some of which they are working; the district carries gold, silver and lead. Mr. Woodman showed assays from their claims which gave respectively in gold, \$750, \$94, \$80, \$60, \$59, \$18 and \$10. Lucky Jim is a new prospect belonging to Martin & Woodman, showing assay of 19 ounces silver, 26 per cent lead and \$3 in gold, while the Maggie, also new, shows 52 ounces silver and 54 per cent lead in the four-foot vein. These men report the country rock as being granite and lime, part of the latter being dolomite, and say: "If the district was as favorably situated as Bingham it would soon ship a thousand tons of ore per day." Ferber is 35 miles from Deep creek and is very similar to Clifton, and has plenty of wood and water for mining. Assays of ore from Ferber show 35 ounces silver, 30 per cent lead and 30 per cent iron. Smelters are running at Sprucemount, and there is need of a smelter where it can be easily reached from Clifton. Ferber and Kinsley is another promising district where there is lead, silver, gold and copper. M. H. Lipman and other citizens of Salt Lake are interested there and have made some shipments of ore. Mr. Chisholm

says of Tybo and Kinsley: "I never saw a district where there was so much ore on the surface. The whole surface is covered with float, and one large boulder was rich ore." Deep creek and these other districts are near the Nevada line, a little south of west of this city.

San Bernardino.

MILL LEASED.—*Calico Print*, June 11: E. J. Murray, superintendent of the Odessa Mill and Mining Co.'s property, recently leased the company's 15-stamp mill at Hawley's. Geo. Dessalier, the foreman of the company's mines in East Calico, has obtained a lease on the Odessa mine, and henceforth the company will not operate their mines themselves, but will lease their properties to choloriders. The prospects of Messrs. Murray & Dessalier doing a profitable business from their leases are good.

Sierra.

SIERRA CITY.—*Mountain Messenger*, June 11: H. Rich & Co. have been awarded the contract at the Parker mine, at Gold Lake, to run tunnel No. 2. This mine is owned by a number of gentlemen from Sierra valley. Tunnel No. 1 was run some time ago to strike the ledge, which prospects very well. Supt. Bacon was in town Monday. The company will build a mill this summer. Pay-day at the Sierra Buttes on Monday, and the town was full of men. The snow is about gone between this place and the Gold Valley mine and work is being rushed. There is a great demand for carpenters. The company propose to build a large boarding-house, office, mill and chlorination works this summer, and will also continue opening the mine.

PROSPECTING.—Reports are to the effect that the Delhi Co. is prospecting the General Grant mine, below Pike City, just across the Yuba, in this county.

Siakiyou.

ORO FINO.—*Yreka Union*, June 9: There have been some more new discoveries in quartz. Under the Eastlick placer mine a large ledge has been found which prospects remarkably well. Gilmore & Son of Hull gulch have struck rich quartz in their mine and will probably make a good season's clean-up. They are enterprising men and richly deserve it. The water supply has again failed and only one company can run at a time. The scarcity of snow points to this state of affairs the season through. Campbell & Co. have quite a crew of men and are making good use of the water while it lasts. All the mines will be through by the 4th of July, making an unusually short season.

Tuolumne.

BUCHANAN.—*Tuolumne Independent*, June 11: New machinery has gone up to the Buchanan mine, and more has been contracted for. At the 600-foot level the mine looks better than ever. Quite a little town has sprung up at this place. Neat cottages have been erected by the company, which the men are permitted to occupy at a small rental, and a store has been stocked, where the workmen can purchase all their supplies at as cheap a rate as from outside places.

LONG GULCH MINE.—*Union Democrat*, June 11: This mine, near Summersville, is one of the old locations of the county. A shaft, 75 feet deep, was put down on it some 20 years ago, proving the good size and value of the vein. Work was suspended because of the strong flow of water. The means of the owners at that time to control the water being limited, they abandoned the work. The present owners sunk a shaft on the southern portion of the mine last year to prospect the vein at that point, and being satisfied with the result, have now secured substantial steam hoisting works, and started a shaft at a point intermediate between the two shafts mentioned, and have sunk it to a depth of some 80 feet, and are driving it down rapidly. They have a strong two-foot ledge at this depth of good ore, and the prospect promises the making of a valuable mine.

BUCHANAN MINE.—Mr. McCaw, a mining engineer from London, and his brother, a practical miner, are now at this mine inspecting it for report to be made to foreign capitalists for purchase, if found satisfactory to them.

Trinity.

ENTERPRISE.—*Trinity Journal*, June 11: Mr. Wm. Leavitt returned from East Fork this week, and reports everything progressing finely on the Enterprise mine. Their new prospect is improving as they sink on it, running from 7 to 14 inches, and nearly all the rock showing free gold. The arastra is running constantly.

EASTMAN'S GULCH.—From Mr. C. L. Blake, we gather the following items relating to Eastman's gulch: The mill on the Venicia mine started up the first of the month on ore from the mine; the mill has a capacity of about 15 tons a day. From all reports the ledge is looking first-rate. The company is building a wagon-road from the mill to tunnel No. 4, and expect to finish it this week. They have run in tunnel No. 4 to a distance of 500 feet, and are pushing it ahead as fast as possible. In the Nob mine, Jas. Fisher has about connected his upper and lower tunnels by a raise; he has now out about 80 tons of fine-looking rock, a part of which he is crushing in the Venicia Co.'s upper arastra. John N. Ames recently found a new prospect between Hickey's and Hamilton's mines, on the extension of the Golden Gate. The ledge shows up from three to four feet in width, broken, and not as yet well defined, but shows every indication of leading to something good. He has traced the vein on the surface for a distance of 150 feet; the rock shows free gold and carries galena sulphurets. Dan Kitchen, who recently leased the First Chance mine of Mrs. J. M. Blakemore, has a very good prospect. He has a ledge of 75 rock which he has followed in about 20 feet, taking out ore as he goes, and which he will crush in the lower arastra. C. Hickey has opened up the old vein in his mine in a new place, and is now engaged in sinking a shaft on it.

NEVADA.

Wahoe District.

CON. CALIFORNIA AND VIRGINIA.—*Enterprise*, June 11: On the 1300 level a west crosscut (No. 2) from the south drift was advanced 40 feet; total length, 203 feet. This crosscut is still showing quartz and vein material. Good progress is making in the raise that is being cut out from the northeast drift up to the 1200 level for the promotion of a circulation

of air at this point. On the 1400 level west crosscut is still passing through vein material of favorable appearance. The north drift, started from the bottom of winze No. 1, has been advanced 40 feet; total length, 130 feet. Streaks of good ore continue to be encountered in this drift, and the whole face is in low-grade ore. Are still extracting ore from the new south stopes on this level. Though the bulkhead portion of the mine is supposed to be filled in every part with carbonic acid gas, that gas is still being injected to keep up the pressure and density in the parts in which was the smoldering fire. In order to make a sure job of it they will continue to inject the carbonic acid gas for some time to come. The usual amount of ore has been sent to the river mills.

HALE AND NORCROSS.—On the 5th station level the north drift has been advanced 25 feet, and No. 2 east crosscut from this drift was extended 28 feet, the last 8 feet being in quartz which gives low assays. The opposite crosscut from this one (No. 2 west) was advanced 25 feet. In the south drift on this level, 60 feet back from its face, have drifted on the ore strata 45 feet east and west, and have discontinued work for the present. East crosscut No. 1 on this level has been advanced 35 feet, and is now 155 feet east from the south lateral drift. Its face is in clay and porphyry, showing some water.

GOULD AND CURRY.—On the 250 level the two west drifts still continue to show some ore of a fair quality. On the 625 level the east crosscut from the main south drift was advanced 35 feet; total length, 383 feet. The face is in soft porphyry, showing clay slips. From the bottom of the winze the east crosscut was advanced 25 feet; total length, 60 feet. The face continues in quartz. Some small stringers of ore are beginning to appear in this quartz.

YELLOW JACKET.—Are taking out 165 tons of ore a day. This ore is being worked at the Brunswick and Vivian mills, Carson river. A part of the Brunswick mill is at present running on Overmou ore, but the Jacket folks will soon have the whole mill, when they will let go their hold on the Vivian.

HENDRICKS.—Machinery being overhauled preparatory to resuming work in the bottom of the shaft, and extending the east crosscut at a depth of about 500 feet, from which good assays were obtained when the last work was done. Col. S. T. Curtis has been appointed superintendent, and has taken charge.

ANDES.—A north drift has been started from the bottom of the winze at a point 60 feet below the 240 level. The drift is out about eight feet. It is in quartz carrying some ore of low grade. The west crosscut on this level, 75 feet north of the winze, is making good progress. The face is in vein material of a favorable appearance.

IOWA.—All the ore-producing sections of the mine are looking well. All defects in the milling machinery have been remedied, and the bad shoes and dies replaced. The mill is now running continuously and doing good work. The outside copper plates are showing amalgam in considerable quantity.

BALTIMORE.—The upraise from the 300 level is showing well in ore of a good quality. The drifts north and south along the vein on this level are making good headway, and crosscutting from them will soon be in order. On the 400 level a considerable amount of good milling ore is being extracted.

ALTA.—On the 825 level are drifting north. The drift is cutting streaks and bunches of pretty fair ore. Have commenced sinking a winze in the south drift on this level. The bottom is in very fair ore. On the 725 level are running south. The face of the drift is showing ore of a very good grade.

HAYWOOD.—The Thompson mill is kept steadily running. All the ore-producing sections of the mine are looking well. The company is likely soon to perfect arrangements for additional milling facilities. They have ore enough in sight to run half a dozen mills right along.

NORTH OCCIDENTAL.—Are arranging to work through the Occidental mine; also, arrangements are being made whereby they will work through the Suro tunnel at a depth of 1300 feet, in conjunction with the Occidental, St. John, and other companies to the southward.

CROWN POINT.—The usual amount of ore is being extracted and sent to the mills on the Carson river. A good deal of prospecting is being done, and some good ore was found between the 300 and 400 levels. The work of exploring the ore deposit found is still continued.

CHOLLAR.—Good headway is making at all points where drifts and crosscuts are being run. No ore is being extracted, but a considerable amount is being opened up in the several levels from the roots of the sagebrush down to the 1300 level.

LADY WASHINGTON.—On the 725 level are drifting north. The whole face of the drift is in ore of a fair milling grade. As no crosscut has been made, the width of the deposit is not known, but it is seen that it is much wider than the drift.

UTAH.—On the 472 level, the north drift from the main west drift was extended 20 feet; total length, 784 feet. The face still continues in vein porphyry, passing through clay slips, and is showing moisture.

SIERRA NEVADA.—On the 520 level, east crosscut No. 2 started last week, from the main north lateral drift, at a point opposite west crosscut No. 9, has been advanced 25 feet; total length, 51 feet.

BELCHER.—Are still taking out about 100 tons of ore a day, which is being worked at the Santiago mill, on the Carson river. A considerable amount of prospecting is in progress at several points.

SCORPION.—The east drift on the 300 level has been advanced 25 feet. This drift is now out a distance of 677 feet east from the shaft. Its face is in soft vein porphyry and clay slips.

BEST AND BELCHER.—On the 800 level west crosscut No. 4 was extended 20 feet; total length, 486 feet. The face is in porphyry and quartz, showing value by assay.

OPHIR.—On the 1300 level north winze No. 1 was sunk and timbered 10 feet; total depth, 55 feet. The bottom is still showing fair grade ore in streaks and bunches.

SAVAGE.—On the 500 level are repairing the various drifts. The west crosscut from the 8th floor above the 600 level has been extended 24 feet, and its length is now 69 feet. The east crosscut from the 5th floor of the same level has been extended 27

feet; total length, 93 feet. On the 600 level No. 6 west crosscut was advanced 21 feet; total length, 213 feet; and the south drift from this crosscut is now extended 25 feet into the quartz body.

Esmeralda District.

A PLACE FOR A BIG MILL.—*Esmeralda News*, June 11: As must be apparent to any person who has ever visited the mines at Aurora, and as a matter of fact, there are thousands of tons of low-grade ore in that camp awaiting reduction. The lack of milling facilities at small cost is the reason this great mass of ore has accumulated. Now to effect the reduction of this ore and to make the camp a big one and one of large profit to the owners of the mines in that district, a large mill should be erected so as to economically work the ore. At a point on the Walker river, a distance of about 16 miles from Aurora, is a splendid site for such works; water can easily be obtained from the river to run a mill of any size, which, therefore, insures cheap facilities for reducing the ore. From the mines to this point there is a good wagon-road nearly all of the way, but, in keeping with such immense reduction works as are necessary to handle the enormous amount of low-grade ore, a narrow-gauge railroad can be easily built; that is to say, at a comparatively small expense. The grade from the mines to the proposed mill-site is a descending one. The country is well supplied with timber.

Eureka District.

MINES THAT WILL PAY.—*Eureka Sentinel*, June 11: The necessity for capital to develop our mines is felt in Eureka. The cost of mining and smelting our ores is remarkably lower than it was in years gone by; yet our camp with its splendid opportunities for the investment of capital is disregarded, while worthless properties in other districts are easily marketed. We have about 300 mines in Eureka district that would produce ore, but three-fourths of these are lying idle, because the owners have not the means to buy the machinery that will be required to work them. Many of our old-time prospectors, who have developed their mines from the grass roots, are compelled to stop work for want of the machinery needed to develop at great depth. Those who are seeking after good mining investments should quietly drop into Eureka and see for themselves what the chances are.

Gold Run District.

FINE ORE.—*Silver State*, June 13: The Great Republic and New Star Con. Mining Co. has struck a fine body of rich ore in one of its mines in Gold Run district, east of Golconda. The company owns two mines, which adjoin each other, one of which is named Great Republic, and the other New Star. In the latter, at a depth of about 15 feet from the surface, they have four feet of solid ore, the greater part of which assays from \$80 to \$200 to the ton. A few days ago they took out a block of this ore that weighs over 200 pounds. The company's prospects are very bright, and it is probable that reduction works will be erected at Golconda to reduce the ore.

Hawthorne District.

BULLION SHIPMENT.—*Esmeralda News*, June 11: The Lapanta company worked a small lot of low-grade ore at the Moss mill, as an experiment, and yesterday shipped, per Wells, Fargo & Co.'s express, a three and a half pound bar of gold bullion, valued at \$1000.

Mt. Rose District.

THE PARADISE MINE.—*Silver State*, June 11: A private letter received by J. H. MacMillan, from Spring City, says the prospects of the Paradise mine have greatly improved within the last few days. There is now from 10 to 12 feet of good ore in the Wild Goose stope, and there is a decided improvement in some of the Paradise levels and stopes.

Mt. Hope District.

THE BATCHELDER MINE.—*Eureka Sentinel*, June 9: The Mount Hope mines embody a belt of mineral ores of silver, lead, and zinc. The Batchelder mine is a lode of the greatest magnitude we have ever seen. This lode has been explored to a depth of about 150 feet and has been drifted on in different directions for several hundred feet; yet to it there is neither sides nor bottom. The mine looks best where it is the deepest, for there it is that the ore is rich and permanent looking. Prof. Price appeared to have been surprised at the magnitude of the lode and expressed a very favorable opinion of the property.

Pioche District.

PIOCHE CON.—*Pioche Record*, June 6: W. S. Godbe, manager of the Pioche Con. Co., arrived Sunday last from Salt Lake City. Through the efforts of Mr. Godbe the Pioche Con. property has been put on a basis for starting up, and we understand that shaft work—that of retimbering for the purpose of getting to the bottom of the old Raymond & Ely shaft—will be commenced immediately.

Trinity District.

A MILL.—*Cor. Silver State*, June 9: Lordocks is filled with mining men who are willing to take hold of prospects to develop an industry paramount to all other business in the Silver State. Several men of means and sense, among them Mr. Prince and Mr. Ogg, of Garfield district, are here inspecting Trinity district. The chances are very favorable for a sale, when a mill will be erected somewhere close to Oreana, and the old stamping-ground will once more breathe the breath of life.

Tuscarora District.

COMMONWEALTH.—*Times-Review*, June 10: Shaft has been sunk 19 feet, work is being pushed as fast as possible. Northwest gangway, 300-foot level, has been advanced 35 feet.

BELLE ISLE.—East crosscut, 250-foot level, has been extended 68 feet. Fair progress in line crosscut, and north drift from same, on the 150-foot level. The workings are in very hard rock.

GRAND PRIZE.—New gallow-frame was completed on the 7th. Started the hoist the day following, and put men to work in the shaft cleaning it out, and replacing broken lagging and timbers, which will require about a week's time.

NEVADA QUEEN.—Shaft has been sunk 18 feet and connection made with 350-foot level. Station is being cut out and timbered.

NORTH BELLE ISLE.—North gangway, from south

end line, 400-foot level, has been extended 20 feet. We are now within a short distance of the shaft, with which a connection will be made by an upraise from this level, to drain the water, then the shaft will be sunk and timbered to the 400-foot level. Work on the foundation for the new hoist will be commenced next week.

DIANA.—Everything will soon be in shape to resume work on the 200-foot level. A crosscut has been started east from the 150-foot level of the North Belle Isle.

NAVAJO.—South drift, west vein, 150-foot level, has been extended 8 feet. South drift from Johnson crosscut advanced 12 feet. South winze on east vein has gained a depth of 100 feet. The setting of the large pump and other work at the pump station on the 350-foot level will be completed in a few days.

ARIZONA.

BRADSHAW BASIN.—*Cor. Prescott Courier*, June 2: The section of Yavapai county thus designated is about 40 miles south of Prescott, at the head of Black Canyon creek and at the foot of the great Bradshaw range of mountains. The Basin is well timbered; grass and water are abundant. Near it are the Tiger, Oro Fino, Gray Eagle, Cougar, and many more rich mines of gold and silver. In selecting properties here, Mr. Jos. Reynolds (Diamond Jo) struck his stakes in Del Paso mountain, a little north of the Basin, and he is now expending large sums of money in opening mines and putting up reduction works. Mr. O. F. Place, general manager for the Moody & Place Mining Co., of Bradshaw Basin, is also developing properties. Selecting two or three good-looking ledges, he tested them pretty thoroughly; they stood tests and he soon after secured U. S. patents to them. His principal mine has yielded, by milling tests, \$25 and \$80 per ton, gold. The vein is large and well defined. Some seven months ago, Mr. Place became aware of the fact that it was a wet mine; water, in large quantities, bad to be hoisted from the bottom of the shaft. Then it was that he conceived the idea of tunneling, so he let a contract to run a 250-foot tunnel to tap the ledge, he agreeing to pay for said work at the rate of \$10 per foot. Mr. Place will now crosscut to what he calls an upper ledge, but what is, we believe, the mine in higher ground. When this crosscut shall have been made, he will have a 350-foot tunnel in a great vein, and will have gained a depth of 250 feet.

MOHAVE NOTES.—*Miner*, June 11: A carload of C. O. D. ore was put through the sampling works on Tuesday, and another on Wednesday. Superintendent Mackenzie had a carload of ore from the Cupel mine worked this week, but the assays have not yet been received from Prescott. Mr. R. S. Williams, a mine-owner and capitalist of Providence district, across the Colorado, brought in six tons of very rich gold ore on Wednesday, and had it sampled. Mr. Howell tells us that the carload of lead ore from the C. O. D. mine, worked this week, sampled 111 ounces in silver, which is twice as much as any previous lot of lead ore which was ever worked from this mine. The returns from the high-grade ore have not yet been made. Fourteen tons of rich ore was hoisted from the Keystone mine, Mineral park, last Saturday. We hear this morning that the lessees have made another rich strike, but have been unable as yet to learn its extent. Mr. Dennis tells us that ore is coming in very slowly to the sampling works on account of scarcity of pack trains. This should not be the case, as the mines are taking out more ore than ever before in the history of the county, and the dumps are crowded with ore sacked up ready for the packers. Whoever will bring 50 or 100 pack animals to Wallapai district can get steady work for them for some time to come.

IDAHO.

THE JUNCTION COMPANY.—*Wood River Times*, June 8: George W. Paylor, superintendent of the Junction Mining Company, arrived to-day from San Francisco. The first move he will make will be to call for proposals to sink a double compartment shaft on the Junction claim.

ANOTHER MINE ON DEER CREEK.—The Emery mine, on Deer creek, is opening out splendidly. The ore vein now shows up two feet in width, and is exposed a length of fully 60 feet. The ore is high grade, and parties who have visited the mine say that it promises to be fully as good as the Idahoan.

CAMAS TO THE FRONT.—I. S. Waring thinks that he has found the continuation of the Gold Belt on Elk creek, about five miles from Crichton, Camas Prairie. Himself and his partner, Corcoran, have located claims called the Fanny Waring and Pride of Camas, on a vein which shows nine feet in width of rich ore that assays from \$41 to \$233.08. Six assays were made of rock taken along the ledge. A new mining district is to be organized there soon.

CLOSED.—*Idaho Avalanche*, June 11: The De Lamar mill is now closed down for a few days, but will start again as soon as the cleanup of the 100 tons of Wilson ore, just reduced, is made. The lode recently discovered by Messrs. Sullivan and Phillips, on Florida mountain, is being developed into a large and rich lode. A shaft is now being sunk in rich gold ore. The width of the lode is not yet known, but from the large boulders of quartz taken out, it is probably five or six feet wide. The discovery was made under the old Black Jack orchard, and the lode is supposed to be the one that fed Coffee gulch with rich placer gold.

MONTANA.

BUTTE NOTES.—*Miner*, June 8: Much prospecting and taking out of ore is being done on the Ore Butte. At No. 1 shaft they are down a depth of 40 feet. Eight different assays return an average of 48 ounces per ton. Messrs. Hammer & Dunwood, the lessees, still continue to sink No. 2 in a tunnel running from Missoula gulch, crosscutting the ledge. The works of the Tracy tunnel in Park canyon, a distance of 400 feet from the Major Budd mine, are being run night and day. At present the tunnel is in a distance of 200 feet on a quartz seam running direct to the ledge. Assays made from the seam during the progress of the tunnel showed 110 ounces in silver and a high percentage of copper. The whim and old shaft-house of the Black Pine burned

down Saturday week. Mr. Harper said they intended to tear it away and put up steam hoists outside very shortly. Sinking is being actively carried on at Upton's Mountain Chief at Meaderville. The shaft is now down 430 feet, and it will go 20 feet further. This mine produces both silver and copper, and is chiefly valuable for the former. Lee Durney, John Menary, and Ed. Keith have taken a lease on the Smokehouse lode, and will commence sinking on Utah street to-morrow. This is the outcome of the decisions in the famous Smokehouse cases at Deer lodge, and is the first overt act under the title confirmed to its proprietors. The Minnie Irvine has again resumed sinking the main shaft from the 80-foot level and will continue till the 150-foot level is reached. On the 80-foot level of this mine from average samples the returns were 60 ounces per ton. The Ramsdell Parrot has encountered a large body of 60 per cent copper ore on the 200-foot level during the past week. This, with the recent find of a large quantity of free-milling silver, will entail putting on an additional force the coming week, and commencement of levels on the 400, as only the station is cut there at present. Pumping has been commenced at the Mountain Consolidated. The undertaking of removing the ore dump at the Anaconda, which has accumulated in the process of developing before erecting their present vast works, has begun. The Placer Lead's shaft is down a depth of 60 feet, and they are now busy drifting and opening up generally. Messrs. Bowden & Co., the lessees, are very quiet about their property, and, from indications, have something good. The Butte Reduction Works have large quantities of ore piles burning around their works, enough to keep them in active operation for a long time. They work almost exclusively on custom ore. Robert Robinson will superintend the Last Chance in Fourth of July district, and operations will be resumed immediately. All the necessary appliances have been purchased. A good deal of ore is being hoisted at the Original, which helps the Gagnon in its pumping operations. The latter's pumps hoist to the 300 level, from whence the Original takes it to the surface. Drifting commences on the 100-foot level of the Trifle to-day. Where the shaft struck the ledge, some very fine ore was encountered. Messrs. Young & Porter are the lessees. Much ore is being shipped from the Stephens, and hoisting is being done by three different shafts and as many different hoisting works. Stopping on the 300 is being pushed in Clark's Fraction, and five men are taking out some very fine ore. William Whitmore is the foreman. The Hope Co. will begin sinking an additional 200 feet to-day. The mine was never in better condition than it is to-day. The Bulm Co. has let the contract for sinking its shaft 100 feet at \$5 a foot. Farraday, of the Morning Star, remarks he will be ready to commence operations by to-morrow. Mining operations have been closed on the Volunteer South upon the Big Butte. There is a prospect of the early resumption of work on the Levina under lessee. Only drifting and general development is in progress at the Orphan Girl. From J. Drew, of the Taylor district, it is learned that the prospects recently struck there are looking very favorable, and he predicts a stampede to that locality in the near future. The converters at the Parrot smelter have been shut down, owing to a scarcity of matte. They will start up again in a day or so. The balance of the vast concern is in full operation.

THE GRANITE.—*Cor. Butte Inter-Mountain*, June 7: The total dividends, including the June dividend of \$200,000, aggregate the princely sum of two and a half million dollars, and since the new dividend order which went into effect in April, the rate has been \$2,400,000 per year. This amount, 50 cent, Plummer states, will probably be increased 50 per cent, and perhaps 100 per cent, inside the next year, by which time the milling capacity will be largely increased. The milling plant of this company is as perfect as can be found anywhere in the world. It consists of the original 20-stamp mill constructed in the fall of 1884, increased to 30 stamps the following year, and the recently constructed 40-stamp mill in which the acme of perfection has been reached. The company has now in contemplation the doubling of its present milling capacity—in fact, more than doubling it. The plan is to erect a new mill down near Philipsburg, to contain 20 five-stamp batteries. It is probable that only half of this number of stamps will be put in this year, however. Adits No. 1, No. 2, and No. 3 are driven in upon the vein several thousand feet each, and in all of them the immense chimney of ore known as the Bonanza Shoot is exposed. Nearly all of the stopping that has been done has been confined to the ground above adit No. 3. For over 2000 feet a vein of ore is uncovered, averaging from four to eight feet in width, and assaying from 200 ounces away up into the thousands in richness. On the No. 6 the same shoot of ore is uncovered for a distance of 2200 feet. The sunp is 100 feet below this line, and drifting will be commenced as soon as the station is cut out. The company has 335 men on its pay-roll. The Granite Co. employs 100 pack-mules to bring in wood from points in the mountains, where wagons would be likely to turn double somersaults.

ANACONDA IMPROVEMENTS.—*Anaconda Review*, June 9: The work of placing the machinery in position at the silver-mill is still being pushed ahead as fast as possible, and if the power was ready the silver-mill would be ready for business within ten days. Ground has been broken just east of the new concentrator for a new smelter building which will be 162x350 feet. The railway track has been laid into the new orehouse, and a number of the partitions in the third building are being taken out preparatory to putting in the steam stamps. The masons are busy bricking around the boilers in the power-house, and everything has assumed its customary business air at the lower works. The tunnel to drain water from the water-wheel pit is within ten feet of completion, and the ditch from the old concentrator to the new power building is being hurried forward. Everything tends to show that the works will be well under operation by October 1st.

PHILIPSBURG.—*Mail*, June 9: The Sulrana, lying east of the Sunnyside and south of the Peer, both of which are locations of the Granite Co., has been bonded by E. D. Holland, Kaiser Bros., and Toni Hynes, to George Babcock, who is representing Butte parties in the deal. The bond is for \$50,000 at nine months; work to commence in 45 days. The New Departure and Piano locations, owned by the same parties, are also included in the bond. We have it on good authority that Mr. Champion will

arrive from Salt Lake by the end of the week, having been successful in forming a syndicate to work the O'Donnell property, now held by M. J. Caplice, adjoining the San Francisco on the south and parallel to it, together with the Sanders, the Sheppard, the Severson, and the Bowie. A Salt Lake expert will accompany him for the purpose of examining and reporting on the properties.

BT-METALLIC.—The Elaine shaft is now down about 370 feet, and water easily handled. We have been informed, though not authoritatively, that the extraction and shipping of ore from this property was discontinued because the machinery is not heavy enough for more than the sinking of the shaft, and this is, of course, the most important present work.

WEST GRANITE.—On the Rattlesnake ground, the shaft has now attained a depth of 300 feet. The ground continues favorable for rapid sinking, though there is a large amount of water. The crosscut on the Butte is now in 60 feet, running through Granite, which in the tunnel face is growing soft as though approaching a lead. The tunnel on the Elizabeth is in 345 feet, following the hanging-wall in promising looking vein matter.

ALTOONA.—The crosscut tunnel got into softer granite yesterday morning, and is by this time fairly in the vein. The width of the vein at the point of tapping it is of course not known as yet. The tunnel reaches the vein some 300 feet west of the shaft.

NEW MEXICO.

THE NORTH HOMESTEAK MILL.—*White Oaks Enterprise*, June 2: This mill is situated about 1500 feet down the canyon from White Oaks. This mill was erected by the owners of the North Homestead mine, Jas. M. Sigafus and J. Everett Bird, of Tarrytown, N. Y. Mr. Bird is the superintendent. Mr. Delarge has charge of the mill. This is an E. A. Huntington centrifugal roller quartz-mill, manufactured at San Francisco, Cal. It is of a type well known upon the Pacific Coast. Although this is the first erected east of the Rio Grande in New Mexico, this is by far the best of the many mills which have used the centrifugal principle of ore grinding or pulverization. The mill is equipped with a Dodge crusher No. 2 Huntington automatic feed, and is otherwise as complete as possible. The owners have abundance of ore and we see no reason why they have not entered upon a long career of prosperity. The frame residence being erected east of the mill, 22x24 feet, will be occupied by Mr. R. Delarge and family. A large body of lead ore has been opened in the Miner's Dream, near Kingston. If further development realize present expectations, the Kingston smelter will start up by the middle of June.

PROSPECTORS.—*Black Range*, June 2: Considerable number of prospectors are looking over the country in this district. Prospectors will find no better showing in the Territory than northern Black range can give. A shipment of ore has recently been made from the Way Up and Little Minnie mines.

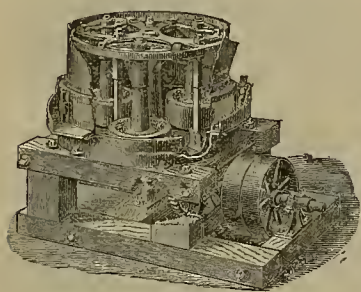
OREGON.

THE TABOR AND SWAN STRIKE.—*Cor. Bedrock Democrat*, June 8: Another monster ledge of gold quartz has been discovered in the Silver Creek mining district by Messrs. Clark, Tabor, Swan & Co., about four miles east of Mother Lode of Cable Cove and running parallel with and somewhat similar to the Mother Lode. The ledge was first discovered last November, in the channel of Cracker creek, where the action of the water had crosscut and exposed it to view for 50 feet in width, showing a mass of sulphureted quartz, with an occasional seam of high-grade gold ore from which a sample was taken for assay which yielded \$80.00 in gold per ton. Nothing more was done with the property until recently, owing to the deep fall of snow, which has rapidly disappeared on the hillside, into which a tunnel is being run along on the ledge, from which samples have been taken for assay which run from \$40.00 to \$185.00 per ton in gold. The hillside into which the tunnel is being run is very steep and facilitates developing to a great depth. On the opposite side of this hill, the ledge is crosscut by the action of the waters of Trout creek, where the same character of ore is exposed as that described above; also, on the top of the hill between these two streams, the ledge crops out boldly, forming large bluffs of decomposed, rusty quartz. In fact, this ledge can be seen for miles cropping out at intervals along its course. A few hundred feet from the above described ledge and running parallel with it is a much larger vein of quartz, which is probably 600 feet in width.

THE PARKER SMELTER.—*Oakland (Or.) Enterprise*, June 10: The new Parker quicksilver smelting furnace arrived on the freight train on Tuesday last, and was conveyed directly to the mine. The work of putting in proper position, ready to receive the ore for smelting, etc., was superintended by Mr. Parker, the inventor. This furnace, Mr. Parker informs us, will do just five times the amount of work of the old ones. Should this smelter do all that is claimed for it, orders for four more will be sent to the foundry. So it is only a question of a month or so when all these mines will be in full operation, and thus open up a new industry in Oakland.

UTAH.

GOOD ORE.—*Southern Utah Times*, June 9: Star mines, south and west camps, are nearly all yielding good ore and proving profitable property. Regular development work goes on at the Horn with mostly new hands underground. Regular shipments of ore are sent out and the big bonanza more than pays expenses. Kruse Bros., Poudler & Kaas are reasonably elated over a new strike of heavy galena ore in their Anchor mine in this district. All the way down, 150 feet, and in all their drifts they have followed encouraging stringers of ore; but not until Wednesday last did they encounter any considerable body. Now the face of the main drift and bottom of the shaft is a mass of beautiful cube galena ore the same as the best that the Carbonate or Rattler mines ever produced. The Anchor is on a line with the above-mentioned property, of the Frisco Mining & Smelting Co., and the opening of the Anchor ledge proves that that entire water belt at the base of the Quartzite mountain is heavy with silver and lead.



Centrifugal Roller Quartz Mill.

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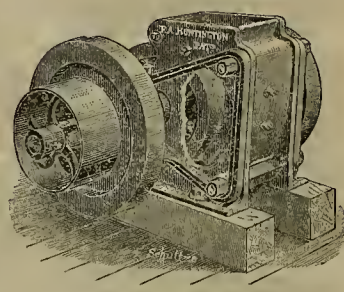
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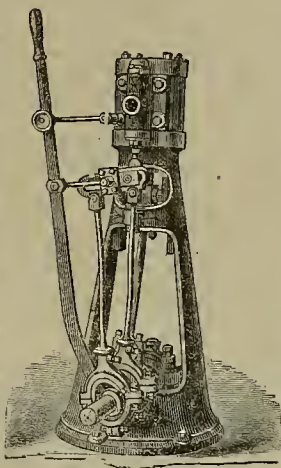
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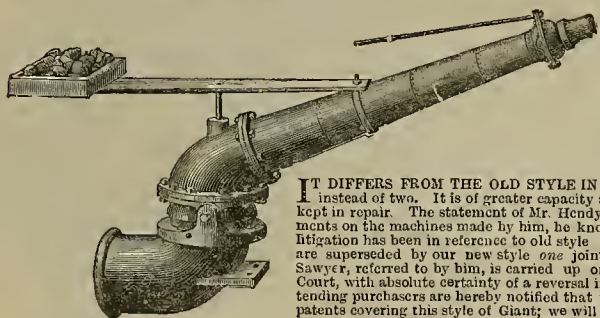
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IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Miners and intending purchasers are hereby notified that we are the sole owners of the patents covering this style of Giant; we will prosecute to the fullest extent of the law manufacturers or users of an infringement.

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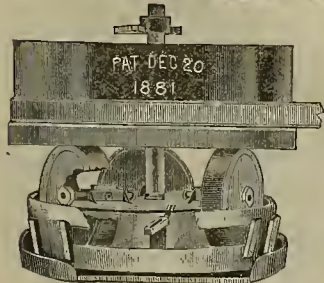
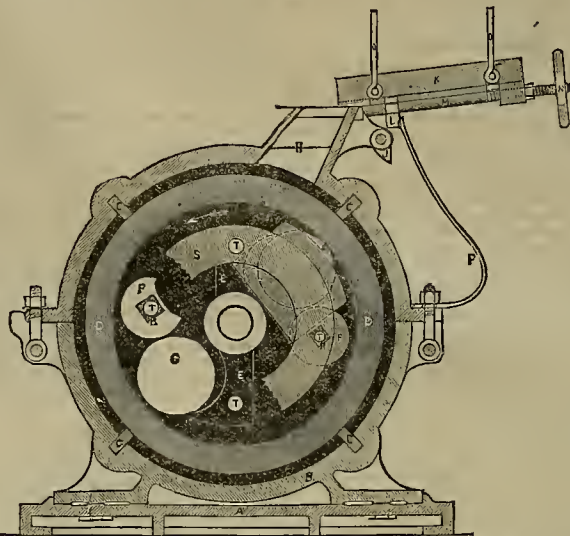
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Very little friction. Beats other machines in reducing and amalgamating ore, and costs less. All who have used this mill recommend it highly. Splendid for low-grade ore on account of low cost of working.

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Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.

All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.

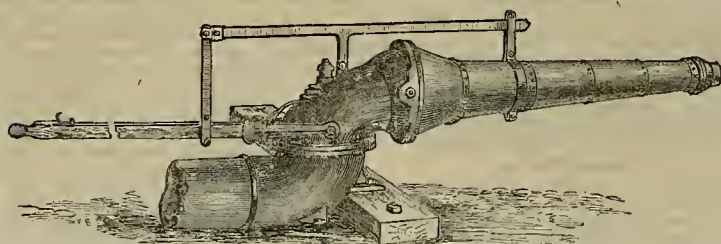
Certificates as to performance of the Mills, and any information required, furnished on application.

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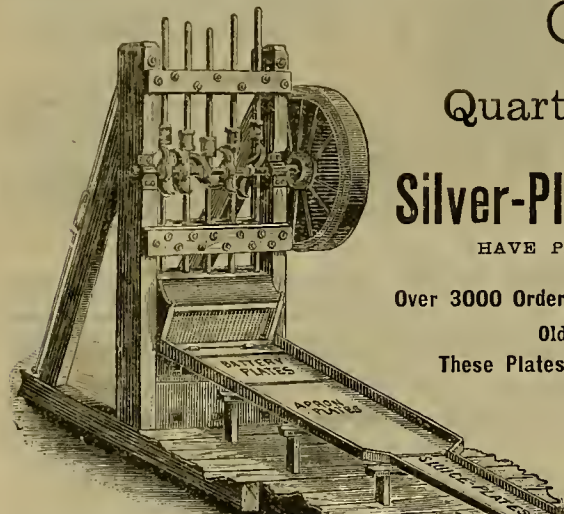
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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

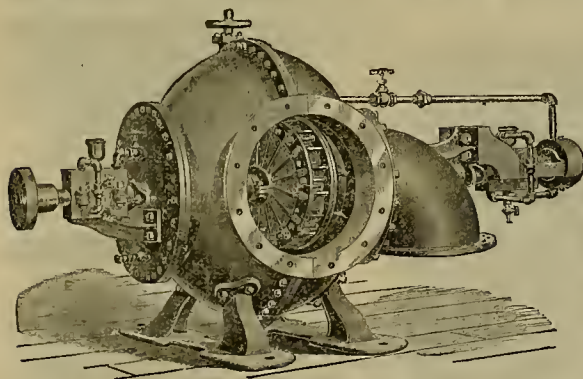
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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING JUNE 7, 1887.

- 364,571.—DREDGING APPARATUS—A. B. Bowlers, S. F.
- 364,480.—ORE-CRUSHER AND GRANULATOR—Christy & Bennett, S. F.
- 364,309.—PIANO ACTION—D. E. Dopp, Santa Rosa, Cal.
- 364,400.—DEPRESSION PULLEY—W. Dunham, Igo, Cal.
- 364,401.—HEADLIGHT—W. Dutch, S. F.
- 364,341.—LID AND DRAINER FOR COOKING VESSELS—O. W. Godkin, Berkeley, Cal.
- 364,408.—CONDITION POWDER—J. W. Griffes, Hanford, Cal.
- 364,509.—FISH-LINE REEL—F. Gundorph, Portland, Ogn.
- 364,254.—WOOD-BORING MACHINE—J. B. Higdon, Vancouver, W. T.
- 364,351.—CAN-HOLDER—Ingraham & Crist, S. F.
- 364,421.—CAR COUPLING—W. A. Ladd, Colfax, W. T.
- 364,362.—PLOW—N. McLean, Watsonville, Cal.
- 364,598.—CAR COUPLING—H. M. Morris, Middletown, Cal.
- 364,372.—SAVING QUICKSILVER—J. H. Rae, Dayton, Nev.
- 364,437.—BRAKE FOR RAILWAYS—E. L. Reese, S. F.
- 364,444.—ANNUNCIATOR SYSTEM—Paul Seiler, S. F.
- 364,606.—BARREL—John T. Smith, S. F.
- 364,611.—TOWEL-RACK—F. W. Swigart, Cloverdale, Cal.
- 364,559.—HOSE-COUPERS—W. F. Wamsley, Walla Walla, W. T.
- 364,558.—HOSE-COUPERS—Wamsley & McIntosh, Walla Walla, W. T.
- 364,323.—REVERSIBLE BROILER—A. A. Waterhouse, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CONDITION POWDER.—James W. Griffes, Hanford, Tulare Co. No. 364,408. Dated June 7, 1887. This is a new and useful composition of matter to be used in veterinary practice as a condition powder. It is intended for the treatment of all blood diseases, and is given in doses of one tablespoonful twice a day, mixed with the feed. The compound is composed entirely of vegetable substances.

REVERSIBLE PLOW.—Neil McLean, Watsonville. No. 364,362. Dated June 7, 1887. This is an improvement on a patent which was granted to the same inventor last year. The present invention has for its object such a construction of the framework and the shares that either one may be removed when desired to use the plow as a single plow only, and a short supplemental landside may be put on in the place of the one removed. It also relates to certain improvements in the device for holding and locking the beam.

APPARATUS FOR SAVING FLOURED QUICKSILVER.—J. H. Rae, Dayton, Nev. No. 364,372. Dated June 7, 1887. This is an apparatus which is especially useful to assist in the amalgamation of precious metals and to save quicksilver which has been floured by grinding or other processes so that it is liable to be carried off in a state of minute division. It consists of a pan or tub within which the usual muller arms are operated, and in connection with this of a circular electrode having numerous points, and so suspended as to dip into the upper part of the material contained in the tub, while the negative electrode connects with the metallic lining or bottom of the tub. We gave a detailed description of this apparatus with engraving, a few weeks since in the PRESS.

PIANO ACTION.—Daniel E. Dopp, Santa Rosa. No. 364,399. Dated June 7, 1887. This relates to actions of upright pianos. It consists in the novel spring connections of the hammer-butt and the back-check by which the inventor avoids the employment of ordinary pivots packed or hushed with cloth, which become subject to dampness, and also by which a satisfactory delicacy and rapidity of action are effected; in the adjustability of these spring connections for the purpose of exactly adjusting the hammer and the back-check; in the peculiar arrangement and relation of the back-check to the hammer-butt and operating jack whereby said back-check is enabled to take the place of said jack after the latter has thrown off the jack, by which means a rapid retreat of the hammer is produced; in the damper, spring and connection by which said damper is operated, and in the screw-guides for adjusting the jack extension, and other details.

DEPRESSION PULLEY.—Warren Dunham, Igo, Shasta Co. No. 364,400. Dated June 7, 1887. This depression pulley for cable roads consists in the novel split or separable pulley, the means for opening it to release the rope,

the means for closing it and details of construction. Depression pulleys are used at changes of grade in the line of the road, the object being to hold the cable down to conform to the general line of its travel in the tubs or tunnel. Sometimes these pulleys are fixed or stationary, in which case they are peculiarly located, and the gripping device is also constructed in such a way that it removes the cable to one side as it passes the pulley, thereby avoiding interferences. Sometimes depression pulleys are mounted in pivoted frames, so that they may be knocked-out of the way by the passing grip, the pulley being returned to position by a weight. It is the object of this invention to provide a simple and effective pulley of this class, the construction and operation of which are essentially different from those now in use.

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, JUNE 16, 1887.

ANTIMONY—French Star	91 @	21
IRON—Glengarnock ton	—@23 50	
Eginton, ton	—@28 50	
American Soft, No. 1, ton	21 @	23 00
Oregon Pig, 7 to 10 lb	22 @	23 50
Clippings, Nos. 1 & 4	22 @	25 00
Clay Lane White	22 @	25 00
Shotts, No. 1	30 @	—
COPPER—		
Bolt	19 @	21
Sheeting	18 @	—
Ingot	12 1/2 @	13 1/2
Fire Box Sheets	—@	21
LEAD—Pig	5 25 @	5 50
Bar	8 @	—
Sheet	8 @	—
Shot, discount 10% on 500 bag	Drop, 1/2 bag	1 80 @
Buck, 8 bag	2 00 @	—
Chilled, do	40 @	—
QUICKSILVER—By the flask	1 05 @	—
Flasks, new	85 @	—
Flasks, old	15 @	25
STEEL—English, lb	16 @	25
Black Diamond, ordinary sizes	8 @	13
Pivot	3 1/2 @	6
Machinery	3 @	6
Naylor & Co.	10 @	14
ZINC—German	2 3/4 @	9
Sheet, 7 to 10 lb	6 1/2 @	6 50
TINPLATE—Coke	6 25 @	6 50
Charcoal	7 1/2 @	8 1/2
BORAX—San Bernardino	—@	5
Armstrong	—@	5

New York Metal Market.

Telegraphic advices dated June 16th give the following New York prices:

RAR SILVER—50c per oz.	
BORAX—54@54c	
COPPER-LAKE—\$9.26@9.50	
IRON—No. 1, \$22.00	
LEAD—\$4.30@4.35	
QUICKSILVER—52@54c	
The following is the latest by mail from the "New York Metal Exchange Market Report":	
COPPER—Firm, spot closing at \$9.90@10.00. Transferable Notices (Lake) issued at \$9.85@—, Transferable Notices (Chili Bars) issued at \$9.80@—.	
LEAD—Steady at \$4.67@4.76 spot. Transferable Notices issued at \$4.72 1/2.	
TIN—Quiet at \$22.75@23.10. Transferable notices issued at \$22.80.	
Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.	
Australian Tin, \$23.00@23.25; Billiton Tin, \$23.50@23.60; Banca Tin, \$23.00@24.00; Baltimore Copper, \$9.05@9.25; Orford Copper, \$9.00@9.25; P. S. C. Copper, \$10.00@10.25; Foreign Lead, \$4.67@4.76; Foreign Spelter, \$4.70@4.75; Antimony, \$7.65@7.70.	
MARKERS' PRICES—At tidewater. 100-ton lots of listed metals (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$20.50@21.00; No. 2, \$19.50@20.50; Grey Forge, \$17.50@18.00; Hudson River, Grade No. 1, \$20.50@21.00; No. 2, \$20.00@21.00; Grey Forge, \$17.50@18.00; Southern, Grade No. 1, \$21.50@22.00; No. 2, \$21.00@—; Grey Forge, —@—.	

Mining Share Market.

There is little new to report in the stock market regarding the situation in the Comstock mines; it also steadily growing better. Extensive explorations are in progress in nearly all the leading mines, and many new and valuable deposits of ore are being developed and opened up ready for extraction with no required. The lower levels of several leading mines are stacked full of ore.

It is now conceded by all mining men that the fire in the bulkhead portion of the Consolidated California and Virginia mine has been drowned out by the flood of carbonic acid gas poured into it, and that work may soon be commenced in the region so long occupied by the smoldering fire. They will soon have two big mills ready to work the ores of this region, and to work them at a good profit, as the mills will be run by water-power.

Work is progressing rapidly on the big new water-mill that is to be erected just below the Chollar old shaft. The stone foundations will soon be completed, and by that time the timber work will be ready to be placed in position upon them.

There is a fine stage of water in the Carson river, and it is likely to last all summer. The capacity of some of the river mills is being increased, and soon the amount of ore reduced down there will be greater than for many years past.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Drummond (for May) \$195,000; Alice, 8, \$19,600; Moulton, 9, \$21,840; Lexington, 10, \$19,362; Hanauer, 9, \$25,770; Germania, 12, \$60,290; Hanauer, 12, \$32,000. The shipments of the metals out from Salt Lake City for the week ending Saturday, June 11th, inclusive, were 22 cars of bullion, 533,293 lbs.; 55 cars silver and lead ores, 1,659,850 lbs.; 4 cars copper ore, 108,300 lbs.; total, 81 cars, 2,301,448 lbs.

THE Los Angeles Tribune says: Two mountain peaks, and two only, so far as is known, are candidates for the honor of holding up to the heavens Mr. Spence's observatory. These are Wilson's peak and Monrovia peak; this latter is 4000 feet high, and rises up sheer and isolated.

CALICO MINING DISTRICT shipped out \$65,283.59 in bullion during May.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Best & Belcher M Co.	Nevada, 37.	50, June 3, July 8.	Ang 2 L Oshorn.	309 Montgomery St.	June 29
Central California M Co.	Cal 40.	Apr 27, June 8.	June 22 J G Hulse.	314 California St.	June 22
Crocker M Co.	Arizona, 4.	15, May 16, June 22.	July 13 A Waterman.	309 Montgomery St.	June 20
Champion M Co.	California, 24.	10, Apr 19, May 31.	June 21 T Wetzel.	522 Montgomery St.	June 20
Challenge Con M Co.	Nevada, 3.	30, May 26, June 26.	July 10 C L McCoy.	329 Pine St.	June 15
Gray Eagle M Co.	California, 2.	01, May 17, June 22.	July 1 T Wetzel.	522 Montgomery St.	June 15
Golden Fleece M Co.	California, 9.	10, Apr 26, June 3.	June 30 W J Gleason.	Phelan Building	June 15
Gould & Curry S M Co.	Nevada, 56.	50, June 3, July 8.	Ang 2 A K Durrow.	309 Montgomery St.	June 15
Hobart Concentrator Co.	California, 2.	10, May 10, June 16.	July 18 M Livingston.	230 Montgomery St.	June 15
Hoch M Co.	Idaho, 1.	15, May 20, June 30.	July 25 W L Oliver.	323 Montgomery St.	June 15
Locomotive M Co.	Arizona, 1.	25, June 1, July 1.	July 20 J Crockett.	327 Pine St.	June 15
Live Oak Drift M Co.	California, 5.	10, June 15, July 15.	Ang 6 T Wetzel.	522 Montgomery St.	June 15
Mocking Bird M Co.	California, 1.	05, June 15, July 23.	Ang 10 D Buck.	309 Montgomery St.	June 15
Morell Con G M Co.	California, 2.	3, May 31, July 2.	July 10 W G Disturrell.	512 Montgomery St.	June 15
Sanhattan S M Co.	California, 1.	1,00, June 1, July 1.	July 21 J Crockett.	323 Montgomery St.	June 15
Mayflower G M Co.	California, 36.	25, June 2, July 6.	July 29 J Morizio.	323 Montgomery St.	June 15
New Con M Co.	California, 20.	20, Apr 15, June 1.	June 25 J L Hunt.	308 Montgomery St.	June 15
Seapion S M Co.	Nevada, 21.	10, Apr 27, June 3.	June 24 G Splanney.	310 Pine St.	June 15
Trojan M Co.	Idaho, 15.	2, June 30, July 30.	July 3 J Scoville.	309 Montgomery St.	June 15
True Con M Co.	California, 1.	21, June 9, July 19.	Ang 18 A Berry.	434 California St.	June 15

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Almont M Co.	Nevada, 37.	T Harmon.	330 Pine St.	Annual.	June 29
Alta Con M Co.	Nevada, 37.	G F Ellis.	309 Montgomery St.	Annual.	June 22
Bodie Con M Co.	Nevada, 37.	G W Sessions.	309 Montgomery St.	Annual.	June 20
North Belle Isle M Co.	Nevada, 37.	J W Pew.	310 Pine St.	Annual.	June 20
Owyhee M Co.	Idaho, 15.	J W Pew.	310 Pine St.	Annual.	June 28

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.....	Nevada, A W Havens.....	309 Montgomery St.....	50.	Apr 7	
Derbec Blue Gravel M Co.....	California, T Wetzel.....	522 Montgomery St.....	10.	May 19	
Original Hidden Treasure.....	Nevada, D A Jennings.....	401 California St.....	13.	Apr 4	
Plymouth Con M Co.....	California, A H Jennings.....	431 California St.....	25.	Apr 4	
Pacific Borax Salt & Soda Co.....	California, H Clough.....	327 Pine St.....	10.	Apr 7	
Paradise Valley M Co.....	Nevada, W Letts Oliver.....	328 Montgomery St.....	10.	Apr 15	
Rural Reduction & M Co.....	California, J Morizio.....	323 Montgomery St.....	50.	June 9	
Silver King M Co.....	Arizona, J Nash.....	328 Montgomery St.....	25.	May 15	

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING May 28.	WEEK ENDING June 2.	WEEK ENDING June 9.	WEEK ENDING June 16.
Alfa.	3.50	4.30	3.70	4.35
Alta.	2.80	4.40	2.30	3.15
Andes.	1.75	2.30	1.60	2.00
Argenta.	.25	.30	.33	.60
Battle Mountain.	4.00	5.00	3.80	5.50
Brophy.	.75	1.00	.75	.95
Best & Belcher.	7 1/2	10 1/2	7 1/2	9 1/2
Bullion.	2.45	2.90	2.40	2.75
Baltimore.	1.00	1.25	1.00	1.20
Bodie.	.80	.85	.85	1.10
Bodie Con.	2.10	3.00	2.50	3.00
Benton.	1.00	3.00	2.10	2.50
Bodie Tunnel.	1.25	1.35	1.20	1.25
Bulwer.	1.50	2.00	1.50	2.25
Con. Va. & Cal.	2.00	2.75	2.10	2.50
Challenge.	7.25	8.50	7.25	8.00
Champion.	1.00	1.25	1.00	1.25
Chollar.	1.15	1.30	1.25	1.60
Confidence.	.75	.85	.75	.85
Con. Imperial.	1.50	2.00	1.50	2.25
Caledonia.	.70	.95	.70	.85
Con. Pacific.	.60	.75	.60	.75
Crown Point.	6.00	6.75	5.80	7.25
Crocker.	.90	1.15	.85	1.20
Con. Nevada.	.60	.75	.60	.75
Coral.	.30	.35	.30	.35
Dudley.	.30	.35	.30	.35
East B. & B.	1.35	1.45	1.25	1.80
Eureka Con.	.65	.75	.65	.75
Exchange.	1.50	2.00	1.50	2.25
Gold & Curry.	4.80	6.25	4.80	5.50
Hale & Norcross.	.50	.65	.50	.65
Holmes.	.60	.75	.60	.75
Independence.	.60	.75	.60	.75
Con. Imperial.	1.50	2.00	1.50	2.25
Julia.	.85	1.05	.80	.95
Justice.	1.50	2.00	1.50	2.25
Kentuck.	.95	1.30	.95	1.20
Lady Wash.	.95	1.30	.95	1.20
Martin White.	.75	.85	.75	.85
Mono.	2.70	2.75	2.50	3.00
Mexican.	.50	.70	.50	.65
M. D. Diablo.	.60	.75	.60	.75
Northern Belle.	1.25	1.40	1.30	1.65
Nevada.	9.50	6.75	10.00	10.75
Niagara.	3.85	4.50	4.70	5.50
Nev. Queen.	.50	.65	.50	.65
North O. & O.	.35	.45	.35	.45
Occidental.	.85	1.25	.85	1.10
Ophir.	8.75	12.00	9.50	12.00
Overman.	1.95	2.60	1.90	2.40
Potosi.	3.25	4.00	3.25	4.00
Potosi.	.75	.85	.75	.85
Pect.	.40	.45	.40	.45
P. She Idan.	.15	.20	.15	.20
Silver Star.	.50	.65	.50	.65
Savage.	.50	.65	.50	.65
Best & Belcher.	7 1/2	10 1/2	7 1/2	9 1/2
Sierra Nevada.	5.00	6.45	5.50	6.50
Silver Hill.	.55	.60	.55	.60
Silver King.	.90	1.15	.90	1.10
Scorpion.	.90	1.15	.90	1.10
Union Con.	4.00	5.00	4.00	5.00
Utah.	2.20	3.00	2.10	2.40
Yellow Jacket.	5.00	6.75	5.00	6.50

Sales at San Francisco Stock Exchange.

THURSDAY June 16, 1887.	200 Grand Prize.	1.70
1425 Alta. 1.10@1.85	1000 Hale & Nor.	4.00@4.60
200 Andes. 1.30	250 Justice.	1.25@1.40
200 Atlantic. .50c	100 Julia.	.55c
200 Alpha. .30	100 Lady Wash.	.85c
481 B. & Belcher. .60@.70	420 Mexican.	.45c
770 Bullion. 2.05	50 Mono.	.25c
310 Benton. 1.10@1.30	200 Navajo.	.75c
1030 Belcher. 4.35@4.60	300 Nev. Queen.	.45c
500 Baltimore. .75@.90	740 Ophir.	.80@.85
780 Belle Isle. .90c	430 Overman.	1.60
250 Bulwer. 1.10	50 Potosi.	.65@.70
820 Chollar. .60@.65	500 P. Sheridan.	.15c
760 Con Va & Cal. .20@.25	370 Silver Hill.	.40c
680 Crown Point. .90c	210 Scorpion.	.65@.70c
800 Crocker. .90c	800 Savage.	4.00@4.15
230 Central. .55c	740 Sierra Nevada.	4.20
200 Con. Imperial. 1.90	50 Seg. Belcher.	1.70
65 Caledonia. .50@.60	450 Union Con.	3.15
460 Exchange. 1.25@1.30	100 Utah.	1.50
530 Gould & Curry. 3.30	100 Yellow Jacket.	.50

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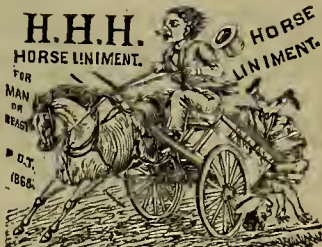
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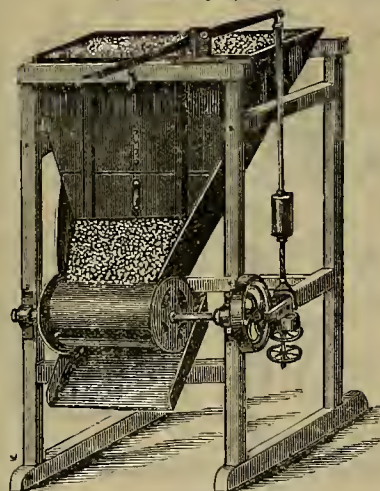
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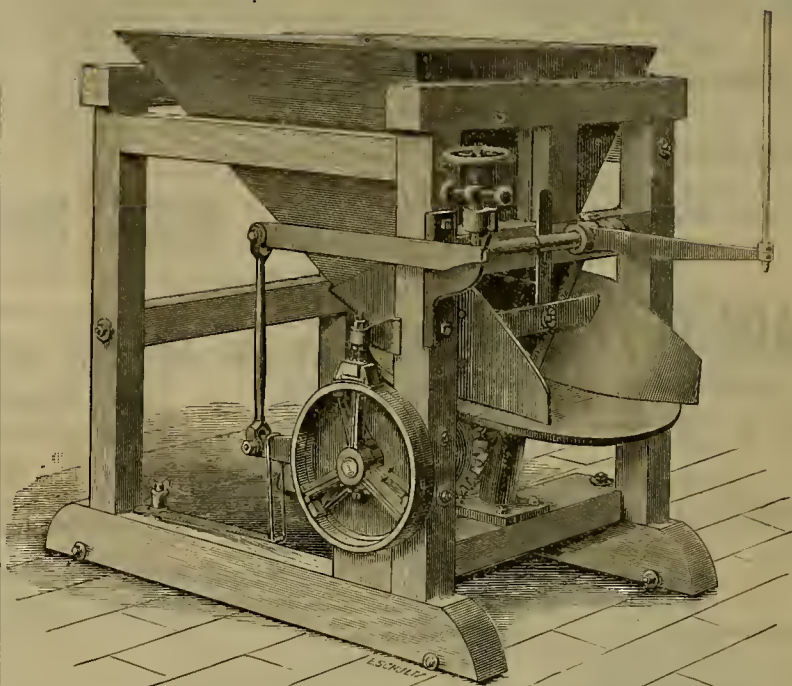
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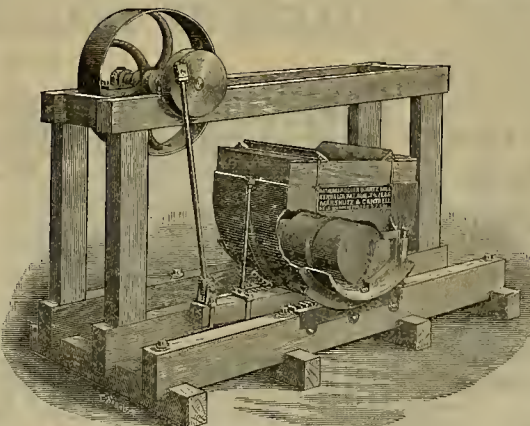
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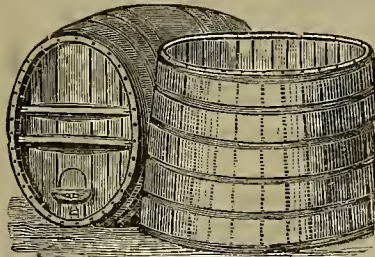
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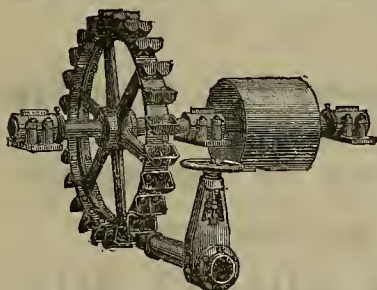
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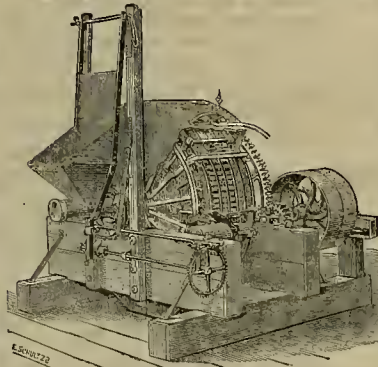
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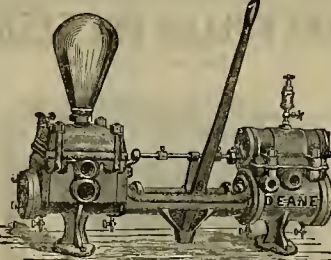
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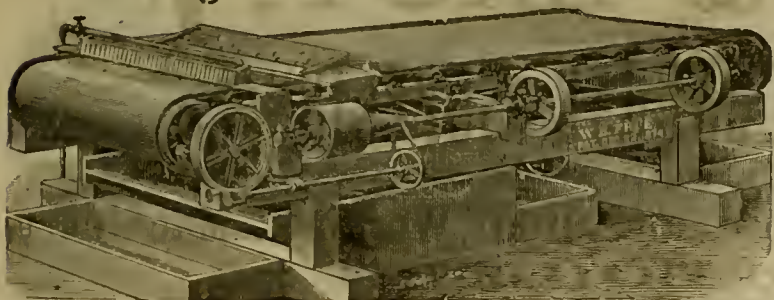
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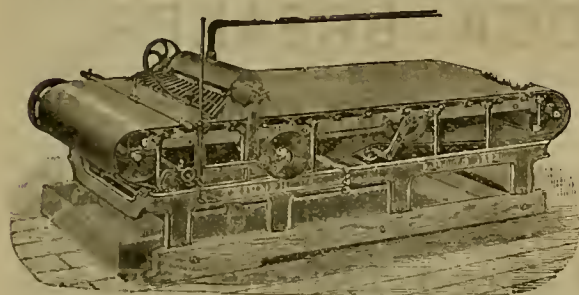
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N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

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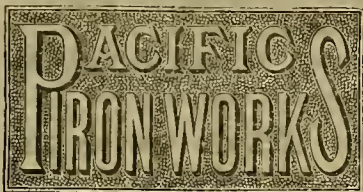
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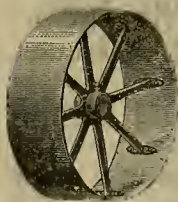
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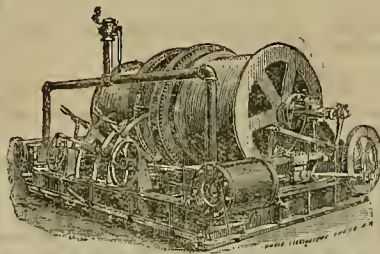
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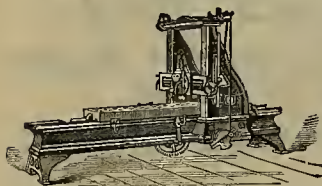
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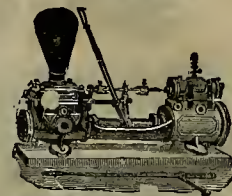


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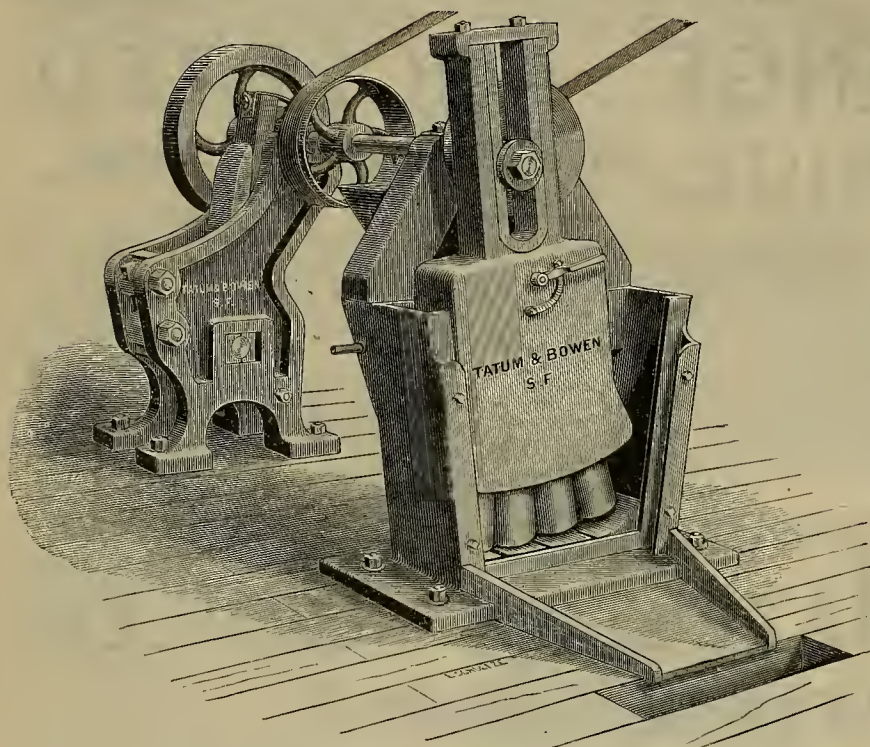
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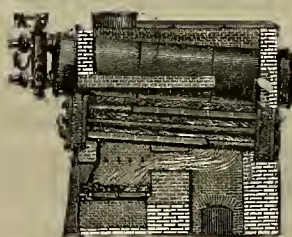
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, JUNE 25, 1887.

VOLUME LIV
Number 26.

Diamond Mines.

The engravings on this page represent sections of the famous Kimberley diamond mine, South Africa. The mine was discovered in 1871, and is by far the richest in South Africa. Gardner F. Williams of Oakland, Cal., recently read a paper describing these mines before the American Institute of Mining Engineers, and from this we take the descriptions of the mine.

Figs. 1 and 2 are sections. The drawings are taken from Government reports and represent the work done up to the end of 1883. The Kimberley has been worked as an open mine to a depth of nearly 500 feet and a prospecting shaft has been sunk in the bottom to a further depth of 100 feet. The outer line, Fig. 1, shows the opening at the surface. Below the red soil of the surface was found a decomposed or disintegrated diamond-bearing earth, which gradually changed into the "blue" or hard diamantiferous cement. This deposit was surrounded on the surface to the depth of 60 to 70 feet by a yellow shale. Underlying the yellow shale is a black shale about 200 feet thick. Below the black shale is a very hard, amygdaloidal, igneous rock. It will be seen by the engravings presented on this page that in depth the surrounding rocks are gradually encroaching on the diamond-bearing earth.

This is proved to be the case on the north, south and east sides of the mine, and until recently it was assumed that the hard rock would also be found to encroach on the west side. The "blue" ground in that part of the mine has been very poor, and the hard wall-rock has not been reached except by tunnels or drifts. This work shows the hard rock at two points, one 50 feet above the other, to have a decided dip to the northwest or outward dip. Further work will have to be done to prove beyond a doubt the position of the wall-rock on the west end of the claim.

The greatest drawback to the working of the mine has been the caving of the friable shales which surround it. As soon as the claims lying adjacent to the shale had been worked to any depth, the shale (or "reef" as it is usually called) commenced to subside and fall into the pit. The greater the depth attained, the more extensive have been the falls of the shale. During the past few years the work of hoisting "blue" ground has been almost entirely stopped for months at a time, owing to the great masses of fallen reef which have to be removed.

The Mining Board had moved, under their direction, from the commencement of work on its mine to May 1, 1883, 10,328,489 loads of 16 cubic feet. It is assumed that a load is equal to 10 cubic feet of rock in place, which would give 3,824,440 cubic yards of solid rock.

In September, 1884, there was an immense cave which completely buried a large portion of the mine and destroyed a large amount of machinery. In another number of the Press will be given the methods of working these mines.

The Crown Point Mine.

The Crown Point mine, in Nevada county, this State, is being negotiated on the London

Academy of Sciences.

At the regular meeting of the California Academy of Sciences on Monday evening, Dr. Gustav Eisen contributed an original monograph, "Anatomy of *Sutroa Rostrata*, Found only in Mountain Lake." Dr. Eisen said he first discovered this worm in 1877 while exploring a small spring on the north side of Mountain lake, near the Presidio Reservation. He had visited

Not a Gambling People.

The spirit of gambling has never been especially rife in California, the general impression to the contrary notwithstanding. During pioneer days, play for money was common in the mining camps and even in the larger towns, but the practice gradually died out as the flush times abated, and is not more prevalent now in this than in the older States of the Union.

We have been a bold, venturesome sort of a people, disposed to take desperate risks and engage in all manner of hazardous enterprises, pushing them sometimes in a reckless manner. We have had excitements in the mining share market, attended with heavy transactions in stocks, but these movements have almost always been based on actual or supposed ore developments.

Hardly ever have they resulted from pools gotten up or corners effected for such special purpose. Rings for speculating in wheat, coffee or other staple commodities of subsistence have been little known here. Efforts made to that end have been with us mere incidents, even our mining ex-

citements having been periodical and short-lived. We have not now, nor have we ever had, anything corresponding to the furor that in New York and other Eastern cities rages without intermission or abatement, affecting all classes of the inhabitants.

Outside the purlieus of the Stock Exchange one hears little of the vile jargon of the "Bourse." Even our business men are little versed in its outlandish nomenclature; not one Californian in a hundred knows anything about puts, calls, privileges, spreads, or straddles, slang with which the average New Yorker is so familiar. To talk to most of our people about these things would be to speak to them in an unknown tongue. To the Eastern operator, with his cute methods, California seems a hucolic country, her people provincial and rustic. If we ever were accounted smart at

illegitimate money-getting, we have been left far behind in this scramble after wealth, in which these Eastern populations are engaging with such indecent and fatal haste.

AN International Congress of Science and Industry is proposed for Brussels in 1888. Prizes to the value of \$100,000 will be awarded for the best papers on various stated subjects, and many important applications of science will be discussed. The commercial section will consider export and import duties. This is expected to prove a welcome change from the round of international exhibitions.

THE Nevada City Transcript says: There is great inquiry for mining property in this section. At least a dozen men from abroad have been here during the past two weeks, looking for investments.

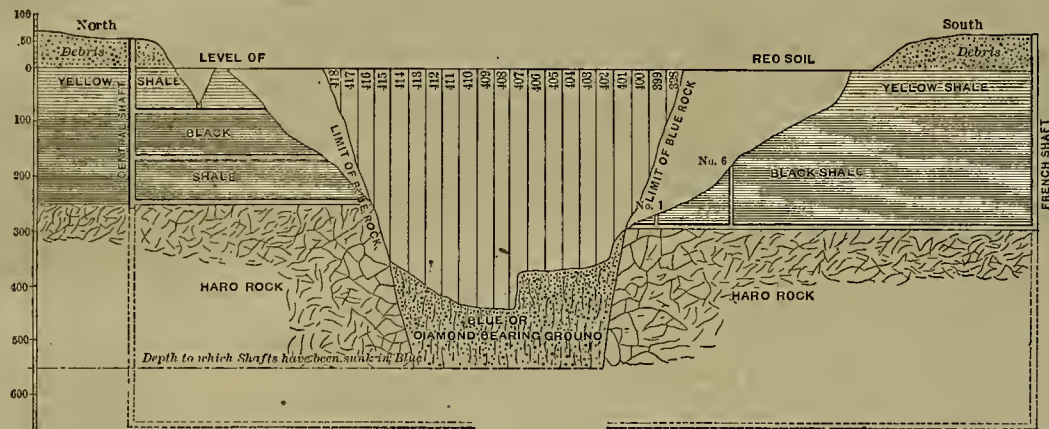


Fig. 1.—NORTH AND SOUTH SECTION OF KIMBERLEY DIAMOND MINE.

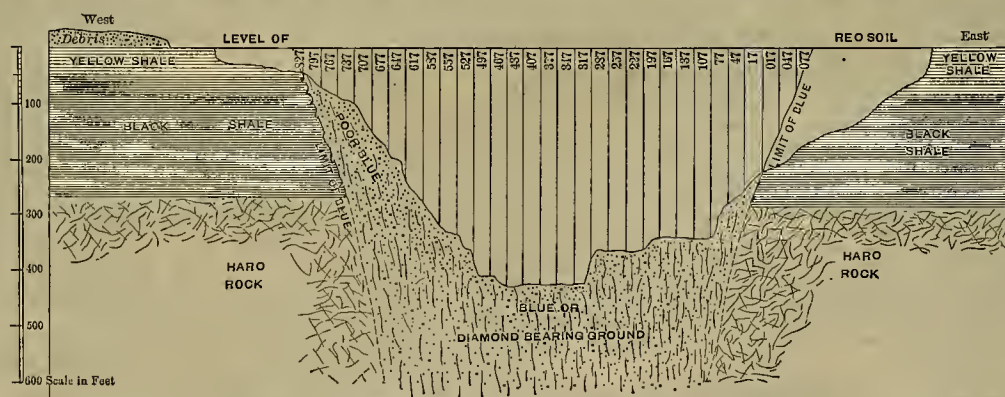


Fig. 2.—EAST AND WEST SECTION OF KIMBERLEY DIAMOND MINE.

feature in these days. Without at all intending to discuss the merits of the mine, of which we know nothing except by hearsay, it is well to call attention to one fact. Some of the "experts" who have examined the Crown Point, from which mine rich specimens have been taken, and which is reported to be a good paying mine, state: "The smaller cost of milling the Crown Point quartz is caused by its being 'softer' than the usual run of milling ore of the district." The fact is that the gangue of the Crown Point mine, instead of being quartz, is a crystalline magnesian limestone or dolomite. We have a piece of this dolomite, and have the result of an analysis recently made by a competent person in this city. It is as follows:

	Per cent.
Carbonate of lime	55.5
Carbonate of magnesia	40.4
Iron and manganese	4.5
Traces of silica	0.5

Archostaphylos, or "Manzanita," a new species of which he had discovered and named Stanfordiana, in honor of Leland Stanford, Jr.

The president announced that Bulletin No. 7 was ready for distribution. It contains the following papers: "Ocean Currents Contiguous to the Coast of California," C. M. Richter; "Pacific Coast Alders," C. C. Parry; "West Coast Pulmonata, Fossil and Living," Dr. J. G. Cooper; "Studies in the Botany of California and Parts Adjacent, VI," Edward Lee Greene; "Ornithological Observations in San Diego County," W. O. Emerson; "Desmids of the Pacific Coast," Francis Wolfe; "Fungi of the Pacific Coast, V," H. W. Harkness; "Occultations of Stars by the Dark Limb of the Moon," George Davidson.

The next meeting of the Academy will be held July 18th.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Gridley and His Sack of Flour.

EDITORS PRESS:—In your issue of June 4th I note your article with above heading, etc., and thinking, after reading yours, that while you are recording history it should be correct and full, I write this.

As president of the Sanitary Commission of the State of Nevada, with headquarters at Virginia City, I necessarily was cognizant of the proceedings for the sale of the Gridley sack of flour, which realized a larger sum from Virginia, Gold Hill, Silver City and Dayton, per capita of population, than from any portion of the United States. The facts are these:

A large public meeting was held on a Sunday (I forget the date) in 1864, at Piper's Opera-house, Virginia City. At that meeting Mrs. Emma Hardinge-Brittan spoke for two hours, stirring the audience to the highest feeling of patriotism. At that meeting I presided. At the close of Mrs. Hardinge's address, a gentleman whispered to me that Mr. Gridley, with his sack of flour, was in the ante-room. (We had all heard of the Austin sales.) "March him in with the sack in hand—quick!" I said, for I took in the situation at a flash. At once I notified the audience that the famous sack of flour and Mr. Gridley were in the building and would soon appear. The word "appear" had only dropped from my lips when in came Mr. Gridley, carrying the sack, amid rounds of applause. Up went the sack for sale, and in a short time over \$1500 in gold coin was received for it. The bids are matter of record in the *Virginia Enterprise*. It was then that the idea of starting out on Monday morning, through Gold Hill, Silver City and Dayton, was conceived and due notice given. The executive officers of the Commission then convened and made up the program for Monday's call on the pockets of the multitude for the Gridley sack of flour. Three open carriages were secured; flags for each of the carriages; a band of music and a large American flag. In due time (about 11 A.M.) all was ready. First came the band with banners flying. In the second carriage was Mr. Gridley, his sack of flour, Samuel Clemens (Mark Twain)—Mark represented the *Virginia Enterprise*, and your humble servant. In a third carriage were other members of the press. Nearing Gold Hill the band struck up the "Star-Spangled Banner," and the street became crowded. Soon a halt was made in front of Maynard's block, and the sale began. About this time the 12 o'clock whistle blew, which brought hundreds of miners to the surface. The sack was sold over and over again. Everybody bought it. Miners launched out their \$20-pieces freely, and in less than one hour over \$5000 was to the credit of Gold Hill section of the Sanitary fund. Your article says the procession was called "The Army of the Lord." There was no procession, but a grand gathering round the sack and carriage. I never heard of the title before reading it in your paper. The same scenes were enacted at Silver City and Dayton. Your article says at Silver City \$1375 was raised. Over \$3000, let it be said for the credit of Silver City (if my memory serves me right), was paid in. Dayton was as patriotic as any. Some gave their last dollar. It was now getting late in the evening. The sack had been sold hundreds of times and still Gridley held the sack, for the grand gathering of \$20-pieces was yet to come off. On reaching Gold Hill, the party took supper. The amounts realized, with other details, were all the time being telegraphed to headquarters at Virginia City, and so excited and patriotic did the people become that the military company was called out, and marched to Gold Hill to return with the carriage as an escort. About 8 P. M. the ball was opened in Virginia City. Miners left their work, and everybody seemed to be on hand. Speeches were made by Charley De Long, William M. Stewart, Thomas Fitch, Sandy Baldwin, and others, and between each the sack was sold and sold again. "Silver and gold seemed as stones in Jerusalem." Virginia City paid in, within about four hours, over \$12,000. The 12 hours' labor footed up (if my memory serves me right) \$20 short of \$24,000. All the money received was put into 14 silver bricks. Each brick had its value in gold and silver stamped thereon and the name of the prominent battle of the time. These bricks were forwarded by express to New York to Rev. Dr. Bellows, president of the National Sanitary Commission. In New York Dr. Bellows called a large sanitary meeting. These silver bricks were hung upon the branches of a tree erected on the stage behind a curtain, and with them, I think, the celebrated sack of flour. Dr. Bellows made the opening speech, and amid applause the curtain was raised, displaying the silver bricks among the evergreen boughs to the glory of Nevada's patriotism—the sack of flour—and memory of R. C. Gridley. Yours truly,

ALMARIN B. PAUL.

San Francisco, Cal., 1887.

The Miners' Union at Batte, M. T., now has 1700 members, and expects shortly to have 2000.

The Bullion Product.

EDITORS PRESS:—Referring to your editorial "Figuring on the Bullion Product," on page 364 in your paper of the 4th inst., I beg to state that the estimates of the honorable Director of the Mint are made up, for the most part, from the data furnished by the officials subordinate to his bureau. As you are aware, Judge Lawton furnishes the figures not only for California, but the whole of the Pacific Coast. Upon the data furnished by myself, the Director bases his estimate for Montana, and I am compelled to say that it is too low, much metal going out in the form of ore and matte which is not credited to this Territory at the port of export.

In regard to the source of deposits of bullion at this office, I would state that the most searching inquiry is made in each case, and any bullion from other districts is so shown in our records.

I inclose herewith one of our blank "deposit slips" which will serve to show the information given regarding each deposit of bullion made here. The deposit slip gives the name of mine, county, mining district, gulch, and number of ounces.

The output of Montana during the year 1886 amounted to no less than \$18,300,000 in gold and silver. Very respectfully,

SPOVILLE BRADEN,
Assayer in Charge.

U. S. Assay Office, Helena, M. T.

Pass Them Round.

EDITORS PRESS:—Your articles in issues of April 23d and June 4th on mining parlance have been read by me, and for fear such brilliant specimens of mine managers (?) might be lost to posterity, I have concluded to contribute my mite on the subject, which has come under my personal experience. One was a manager sent out to Old Mexico, whose ores were high grade in lead but poor in galena. Another was sent to Colorado and had a shaft 225 feet deep, 87 feet from his end line, where he suspected there was a body of ore; so he goes to end line and begins to sink another shaft 225 feet deep to get to it. But, fortunately, before he got it done, the money gave out, as it sometimes does in such Eastern companies. RUSTICUS.

THE CALIFORNIA STAMP AND PANMILLS.—Workmen are engaged in overhauling and putting in thorough repair the machinery of the California stampmill. The framework about the building is being put in order, new floors are being put down in places, tanks are being overhauled and all else is made as good as new. All repairs will be completed in about three weeks. At first the mill will be run by steam till a test has been made of the "Boss" continuous plan of amalgamation. Afterward all the machinery will be run by water-power derived from the Pelton wheels that are to be put into the C. and C. shaft. They are now engaged in work preparatory to the transmission of power from the C. and C. shaft to the big panmill, about 1500 feet to the eastward. They were yesterday laying out the foundations of the towers over which the cables will pass (on proper supporting friction wheels) in running from the C. and C. shaft to the mill. The two principal towers will be 30 and 33 feet in height. As the steel wire belt or cable will not be run in a straight line, there will be proper gearing on one of the towers (that which will be 33 feet in height) to run the cable to the panmill at the proper angle. A trestlework over 1000 feet in length has been constructed from the stampmill down to the ridge above the panmill, on which will be laid the iron pipe which will carry the pulp from the batteries to the pans. This pipe will be four inches in diameter. The trestlework on which it will rest is about 20 feet in height where it leaves the stampmill. This transmission of power to such a distance will be something new on the Comstock, and when the towers are completed, the wire cables put on, and all the apparatus in motion, will be en route to attract throngs of visitors.—*Virginia Enterprise*.

PURE TALC.—A test was lately made by Mr. Louis Blanding at the foundry, in Sonora, of the ability of a sample of pure talc, coming from a vein 20 feet wide and situated in this county, to stand a prolonged trial at white heat. The talc was mixed with $\frac{1}{2}$ its weight each of asbestos and fine clay—thoroughly ground together, made into a paste of thick consistency with water, molded into brick form and then sun-dried. When dry it was subjected to a white heat for five hours in a coke fire, sustained by a strong, steady, artificial draft. After cooling and examination the brick was found to show neither crack nor fusion, even on its sharp edges or corners. This result shows the discovery of this talc vein to be of great commercial value, being applicable to the lining of all forms of smelting furnaces, stoves and boilers. It is superior to fire-brick for this purpose; it can be more conveniently handled, and when the interior of a smelting furnace is to be repaired, as often happens, the material in a plastic state can be rapidly laid on with a trowel, making a smooth surface lining, and little or no chipping of the interior of the furnace is required. All foundrymen will appreciate this advantage and others equally obvious.—*Tuolumne Democrat*.

The Star Sirius.

[Translated for the Press from *El Globo de Madrid* by M. N. M.]

Every night at this time, between 12 and 1 o'clock, Sirius, the most beautiful star of the sky, is seen in the West. During winter it appears in all its splendor; in summer it is likewise visible above our horizon by day, and the astronomers, by the aid of their good telescopes, can distinguish and observe it. The difference which exists between the brightness of this star and all others which adorn space, is remarked by the unaided sight. Those who have doubts can easily fix its position; they have only to ascertain the point at which appear the Pleiades; some two hours afterward the magnificent constellation Orion is visible, and forming a right line with both constellations, and at a distance precisely equal, is present, splendid and sparkling, the most beautiful of stars, of which we now wish to give a faint idea. The wonderful brilliancy of Sirius reveals its extraordinary importance. In the ancient and middle ages it was believed that Sirius exercised a great influence over the earth. The celebrated philosopher, Kant, regarded Sirius as the central axis, the powerful focus of attraction, around which were circulating the sun and all the stars visible from the earth. Modern astronomers wishing to test the importance of this star have analyzed its light, calculated its mass, and measured its distance. Sirius sheds light and heat in torrents. Its sparkles pass over a trajectory of millions of kilometers before reaching the earth, and still preserve energy sufficient to impress the photographic plate and the thermometer. Before Sirius penetrates into the field of a telescope, a splendor of increasing intensity, resembling that of the Aurora, announces its arrival, and, when the dazzling star appears, surrounded by a luminous aureole, the impression that the eyes receive is so lively that they cannot endure it long without fatigue; and yet Sirius, observed with a telescope, is reduced to a smaller point than one can trace with a pen or a needle, however fine it may be. Indeed, stars, although they may be a thousand times greater than the sun, do not present appreciable dimensions to our sight because of the enormous distances they are from us. It is not the size of the stars, but their light, which impresses us. The greater the sight of the observer, the smaller appear the stars. With an excellent telescope, they are reduced to luminous mathematical points, but without extension. The

Astronomical Instruments

Do not augment the size of the stars; they serve to fix with precision the positions of the stars in the celestial sphere, to discover the secondary stars of the double or multiple systems, and to make visible the celestial bodies which are not so to the simple eye. It would be different, however, if we were treating of stars but little distant from the earth. The planets, for example, present in the telescope an appreciable disk in proportion to the optical potency of the instrument. The same takes place with the comets that penetrate into our system, with the sun and its spots, and with the moon, whose topography has been studied minutely and detailedly.

The Disk of Sirius

Measure according to calculations made by Wollaston, the founder of spectral analysis, 29,000,000 of kilometers in diameter, and its volume 7000 times greater than the sun. The parallax of Sirius is .193 of a second, and corresponds to a distance of 1716 billions of kilometers—1,000,000 times greater than the radius of the earth's orbit. It requires 16 years for the light of Sirius to reach the earth. We know ten stars that are nearer to us than Sirius, of which four are perceptible to the simple sight. This is a proof that the apparent splendor of the stars depends not alone on their remoteness, but also on their intrinsic brilliancy. The intrinsic brilliancy of Sirius is very superior to that of the sun. At the distance at which Sirius is found, the sun would appear a little star of the sixth magnitude. If Sirius and the sun should emit the same quantity of light per hectare of surface, the surface of Sirius would be approximately 288 times greater than the sun and 4860 times more voluminous. The diameters of both stars would be in the same relation as the numbers 1 and 17. It is probable that to equality of surface, Sirius may be more luminous than the sun, because the latter, by the yellowish tint, must be classified among the stars of the second, and Sirius figures among those of the first type, by the perfect whiteness of its sparkles. The spectrum of Sirius, rays characteristic of a hydrogenated and brilliant photosphere, is composed of various metals. Sirius, like Vega, Rigel, Regulus and other stars, is a sun, but without spots. Its light dazzles by its intensity, its radiation and activity are prodigious, and its volume is enormous. Considering the intrinsic brilliancy of Sirius, the diameter is not so great as it appears, yet from calculations which deserve entire credit, it is deduced that the surface of this star is 144 times greater than that of the sun, and its volume 1728 times greater. The diameters of both stars are in the relation of the numbers 1 and 12. In order to appreciate fully

these dimensions, it should be remembered that the diameter of the sun is 108 times greater than that of the earth, and that its volume is 2,280,000 times greater. The light of Sirius is four times more intense than that of the star Centaur, now considered as a type of stars of the first magnitude.

The Magnificent Star

Presents in its movement some irregularities whose causes are in part unknown. In order to explain them, the celebrated astronomer, Bessel, supposed in 1844 that a disturbing star allied to Sirius by the universal law of gravitation existed; and in 1857, Peters, taking as a basis the observed irregularities, calculated the probable orbit of the unknown star. Eleven years afterward the American optician, Alvan Clark, constructed a lens superior by its size to any then in use (47 meters in diameter), and to prove the power of this lens the son of Clark directed it to the star Sirius. The enterprise that he experienced was inexpressible. "Father," he screamed, "Sirius has a companion!" In fact, the theoretical star conjectured by Bessel existed, and was shining in the place which the calculation of Peters had assigned to it. Bessel discovered the companion of Sirius in the same manner that Leverrier discovered the planet Neptune—from his cabinet of study, without other aid than numbers and mathematical analysis, and long before the eyes of men were able to perceive it. Marvelous discovery, which, of itself, would suffice to glorify human reason! Bessel died in 1846, without being able to enjoy the immense satisfaction of seeing his prediction realized.

The Small Companion

Of Sirius has been observed with particular attention from the instant in which it was discovered. It is of a magnitude hardly perceptible between the rays of Sirius, and moves around it with great rapidity. Between Sirius and its satellite there is, according to the calculations of Amoers, the distance of 6000 millions of kilometers; seven times greater than the diameter of the earth's orbit. Given this distance, and on the supposition that the revolution of this satellite star is verified in 49 years, according to the calculations made, it results that Sirius weighs 14 times more than our sun, and its companion seven times more. It is not definitely known whether this satellite shines by its own light or if its sparkles are those of the enormous quantity of light which it receives from Sirius. This is a problem which will be solved in time.

The Planets of the System

Of Sirius, if there are such, must revolve at a considerable distance from this splendid star, describing orbits much greater than those of Jupiter, Saturn and Neptune; because if such planets move around Sirius at the same distance as Mercury, Venus, the Earth and Mars revolve around the sun, they would receive a quantity of light and heat so great that life would be impossible on their surface. Sirius exercises an attractive influence upon the nearest stars and upon the solar system. Indeed all the constitutive atoms of the universe operate upon each other at whatever distance they may be.

The Waters of the Ocean

Would be precipitated upon the moon if the force of terrestrial gravity should not impede. The earth with the bodies situated on its surface, attracts in turn the moon, and without going beyond the limits of pure science, we may affirm that each step which we take produces some infinitesimal alteration in our system. The terraqueous globe is subject not only to the preponderant action of the sun, but likewise to that of the other stars. The sun draws the earth with its planets and hears them toward the constellation of Hercules, but the movement of the sun is subject to the modifications with which other bodies incessantly impinge it, and Sirius among them. The part which Sirius performs in the universe is most important. It is impossible to contemplate this dazzling star without feeling surprised at the myriads of and prepotent forces of Nature.

FINE GOLD.—The unusually high fineness of the gold from the San Giuseppe mine, situated half a mile from the town of Sonora, Tuolumne Co., has often attracted the notice and excited the remarks of mining experts. While most gold quartz ores yield halflion that varies from \$16.50 to \$18 per ounce, the gold of this mine has uniformly gone as high as \$20.30 to \$20.40 per ounce. Recently an average sample of the ore for assay was taken from the tailing pile at the mine—some 90 tons in quantity—and the assay gave a result per ton of ore of \$19.64 in gold and one-quarter of a cent in silver. This shows a fineness equal to \$20.63 per ounce, chemically pure gold being worth \$20.67 per ounce. It is stated by men of great experience and extensive acquaintance with the gold mines of California and other countries that no other quartz mine in any country can show such fineness of gold. The only mine approaching it in this respect is the Mt. Morgan in Queensland.—*Union Democrat*.

THE SUPREME COURT has decided that the contractors who built the debris dam must be paid by the State. The money involved is some \$254,000. It will be remembered that before the work was all done the Drainage Act was declared unconstitutional, and the money was not paid to the contractors. It is now ordered paid.

A Great Windmill.

Windmills are so common and so useful in this State that we have thought a picture of one of the largest windmills in the world would interest our readers. It is in fact a good-sized flouring-mill run by wind-power. It is situated in the town of Great Yarmouth, England, and is pronounced a perfect success. The plan of arrangement of milling machinery is different from that of the present day. The mill is working on the old principle of a full reduction at the first grind. J. H. Campbell, M. E., of Yankton, Dakota, who has just published a pamphlet on the windmill and its uses for flouring-mills, sawmills, irrigation, etc., has arranged a mill with machinery so as to use part gradual reduction with burrs and part with rolls.

Of course, it is not necessary to build so large a mill as shown in the engraving, but it is desirable to build as high as possible for two reasons: First, to receive much more benefit by building a mill up to where the wind is fresh and strong; and, second, to get additional storage capacity, and it is much better to have that right in the tower of the mill than put up a building alongside; milling machinery can also be placed to much better advantage. A windmill built after the plan shown in the engraving will be 55-horse power, with the wind blowing at the rate of 25 miles an hour, and will make 120 barrels of flour easily in 24 hours. It is 11 stories high, with basement, and stands 99 feet above the foundation. At the base it is 35 feet in diameter, and 16 feet diameter at the top wall-plate. There are five run of burrs in it. It has four sails on the patent principle, which are 40 feet and 9 inches long by 12 feet 6 inches wide. The sails are 100 feet in the clear, from point to point. They are provided with striking and regulating gear to keep the motion regular and to counterbalance any unevenness in the pressure of the wind. It is provided with winding gear, so as to keep the sails always square to the wind, and it is so adapted that it can be turned out of wind, if necessary, for repairs, etc. The speed of the sails is set to nine revolutions per minute, and the first motion from head wheel to wallower is two to one. The head wheel is iron, with heavy wood segments bolted around the rim of the wheel, so as to form the inner section of the grips which is over and around it, and is used, when necessary, to stop the mill.

The milling machinery consists of one smut, one wheat-brush, two holting chests, three reels in each; one cornmeal bolt, one break run of burrs, one chop run, two run middlings and one run for either middlings or corn, as desired; one set of bran rolls, two set of smooth rolls, three purifiers, one brush-scalper for cracked wheat, and a rolling screen in the basement. It is provided with ample bin storage, so that any part of this machinery may be run and the product dropped without further handling, so as to make use of any and all winds which will turn the sails.

In his pamphlet to which we have alluded above, Mr. Campbell proposes to issue a more complete work, entitled "The Practical Windmill Builder and Millwright," which will give working drawings for making windmills either for flouring, sawing, irrigating, etc. We should imagine from the description that this book will serve an excellent purpose. Mr. Campbell's main design seems to be to induce a large increase in the use of Dakota winds for industrial purposes. We do not suppose that California can compete with Dakota in wind-power, and yet the great use made of wind here for comparatively small purposes would indicate that in some cases extension could be profitably undertaken.

It seems that in the east of England, where there is no coal and water-power is scarce, the windmill still holds its own, and improvements have been many. Mr. Campbell says that the first set of patent sails ever used were made in this town of Great Yarmouth, England, which, by the way, his father constructed and put in operation. Thus the writer has an inherited right to talk about the windmill, and we are glad of an opportunity to introduce him to California readers as a devotee to still further progress in the use of wind-power.

Iron in Del Norte.

It is a fact not generally known to the State at large that immense deposits of iron ore of various grades and classes are found in Del Norte county. Scientific men have at various times, while visiting the hills and mountains near Crescent City since its settlement by the whites, pronounced these ores of a high grade. These ores can be found in immense deposits in various parts of the county, but the bulk of it is in the Low Divids district, where copper mining was carried on quite extensively a number of years ago, and also a Baltimore company extracted large quantities of chromite-iron ore.

In the spring of 1874, William Sublette visited this place and spent some time in prospecting in the mountains in the localities named, with a view to ascertain the real extent of these iron deposits and the facilities which existed for their profitable working. This gentleman went away thoroughly satisfied that these deposits were inexhaustible, and that they

could be worked cheaper, and consequently with more profit, than in any other locality on the Pacific Slope. As a result of his investigations he found iron of all the various grades in abundance, with plenty of limestone necessary for fluxing purposes. Ample water-power is obtainable, and timber for charcoal is limitless. These mines are situated within 10 or 15 miles of Crescent City, which would be the shipping point, and it has been estimated that a tram-

Nevada Mines and Reduction Works.

The Reno Reduction Works have been and will continue to be of great advantage to the river-side town. Presumably the reason Reno was chosen as the situs for these works was owing to its being centrally located, and also because furnishing water-power to operate the

the finest of nut pins and mahogany timber from which charcoal can be made in large quantities at a small expense, and more especially is this true of the range of mountains on the west side of the lake. There is, in addition to the immense body of water in the lake, several large streams flowing into it from the west side, from which abundance of water can be obtained, and with such facility as to obtain any amount of pressure. If such works were erected, the ore which is now being shipped to Reno would be worked here, and would, therefore, not have to be freighted more than one-fourth the distance, and would not have to be transferred from one railroad to another, which means expense; all this would be saved, and it would create greater activity in mining in this county and in the country in proximity to the railroad. This mines at Downeyville and Lodi, in Nye county, which are noted for their immense proportions, could be worked profitably. Many mines in this section would also be worked, which are now unheard of, if such works were erected at the lake. There would we have a mining country, with hundreds of people, and then would the talk of dull times be stopped. When will this ever be done? Will those who are in position to effect this result exert themselves in this direction? Should a few men in this section, who claim to be identified with and who are anxious for the welfare of this county, take hold and try to accomplish these results, they would surely be obtained.—*Emerald News*.

Contributions to the State Mining Bureau.

The following are among the recent donations to the Bureau:

Four sections of mine timbers from the 1550-foot level of the Con. Virginia mine, compressed to about one-third their original bulk—W. H. Patton.

Gold quartz, Sinaloa, Mexico—Geo. Davis.
Silver ore, Queensland—R. H. King.
Calcite, Ruby Hill, Eureka, Nev.—Hank Mitchell.

Vanadinite, Arizona—J. Z. Davis.
Marble, several varieties, from Victor Marble Co., San Bernardino Co., Cal.

Building stones from near Cliff House—A. Sutro; do. from San Miguel, San Mateo Co.—O. E. Brady; do. from Blacklock, Oregon—from the company.

Sandstone and limestones from near Yreka, Siskiyou Co., Cal.—*Yreka Journal*.

Sandstone from Hanley, Siskiyou Co., Cal.—Robert Rangeley.

Sandstone (dressed), from the Southern Ledge Stone Co., Los Angeles, Cal.

Sandstone from Sao Rafael, Marin Co.—Jno. W. C. Maxwell.

Sandstone from Suisun, Solano Co., Cal.—C. P. Reeves.

Sandstone and marble, six varieties, from the Tehachipa Building Stone Co., Kern Co., Cal.

Rich gold quartz from the Providence mine, Nevada City, Nevada Co., Cal.—Melville Attwood.

Gold in calcite from Shingle Springs, El Dorado Co., Cal.—Henry Barnes.

Wulfenite, very fine, from Eureka, Nev.—W. A. Woodward.

One hundred spurs Italian rocks and minerals, cements, limes, plasters, etc.

Nova Scotia Mines.

The following is from the "Report of the Department of Mines, Nova Scotia," for the year 1886:

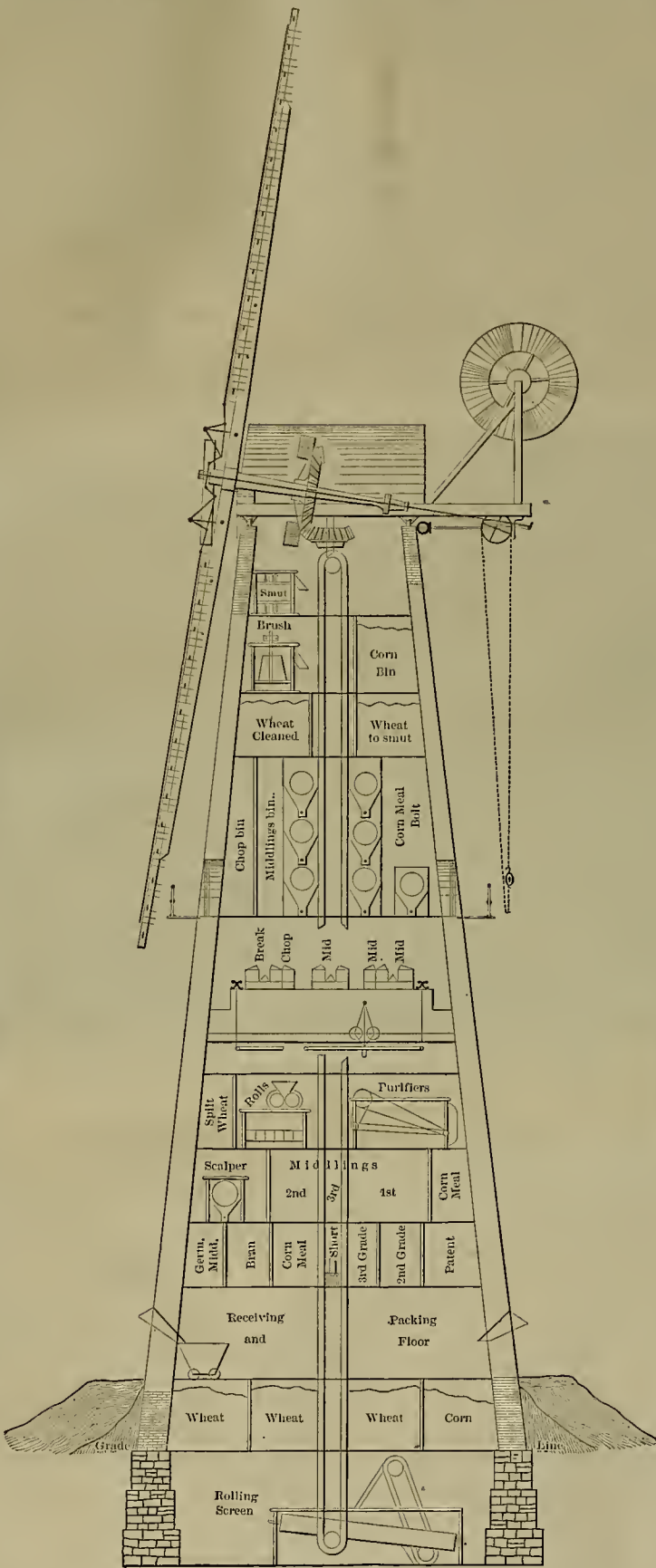
The returns show that 128,880 days' labor were performed, and 29,010 tons of quartz were crushed, yielding 23,362 ozs. 5 dwts., an average of 16 dwts. per ton, the maximum yield being 17 ozs. 10 dwts. per ton, and minimum 5 dwts.

The following summary shows the mineral production of Nova Scotia during the year 1886, compared with that of the previous year:

	1885.	1886.
Gold.....Ounces.	22,203	23,362
Iron ore.....Tons.	48,129	44,885
Barytes....."	353	427
*Antimony....."	758	250
Coal raised....."	1,352,205	1,502,611
*Gypsum....."	87,644	123,753
Building stone....."	3,827	8,000
Coke made....."	30,135	31,604
Limestone....."	16,429	20,205
Grindstones, etc....."	2,208	1,600
*Molding sand....."	.....	200
*Amount Exported.		

CABLE CARS IN A MINE.—The *Anburn Republican* says of a contemplated improvement over in Placer county: A cable for hauling cars into the Hidden Treasures tunnel at Sunny South will soon be put in if found practicable. The expense will be nearly \$10,000, but the cars are now hauled in by horses and the cables will make quicker time. There will also be a saving of the air now consumed by the horses, which is deemed an important consideration.

THE FIVE GREAT INDUSTRIES.—Five great branches of manufacturing employ together 85 per cent of all the water-power that is used. Flouring and grist-mills use 33.4 per cent; sawmills, 22.7 per cent; cotton-mills, 12.1 per cent; paper-mills, 7.2 per cent; and woolen-mills, 4.4 per cent. The iron industry now uses scarcely any water-power.



Scale: 1-16 of an inch=one foot.

LARGE WIND FLOURING MILL AT GREAT YARMOUTH, ENGLAND.

way could be built from furnaces at the mines and the pig iron laid down at Crescent City at a cost of \$1 per ton. Transportation from Crescent City to San Francisco would cost about \$2 per ton, making say \$3.50 per ton from the mines to San Francisco. Sydney coal could be laid down here at a low rate, if this sort of fuel was thought advisable. Could the extent of these mines be thoroughly understood by capitalists, we have no doubt that steps would be taken to bring the iron product of Del Norte county to the front, which will certainly be done before many years.—*Del Norte Record*.

works. We are credibly informed that nearly 60 per cent of the ore received at these works is shipped over the C. & C. R. R.

On either side of Walker lake, but more particularly on the southwestern shore, is a splendid opportunity for capitalists to erect immense smelters and reduction works; and when erected and ready for business, they will have as large, if not a larger, field from which to obtain ore to keep the works in constant operation as there is anywhere.

Esmeralda county abounds in mineral of all kinds; the mountain-sides are supplied with



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W. B. EWER.

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SAN FRANCISCO:

Saturday Morning, June 25, 1887.

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Passing Events.

Volume LIV of the PRESS closes with this number. We trust that all of our old subscribers and patrons are satisfied with our efforts to keep the paper up to a proper standard, and will remain with us for some time to come.

The only mining for copper carried on for some years in California has been at Spenceville, Nevada county. But now the old Copperopolis mines, about which there was such an excitement years ago, are to be reopened and worked again.

Our English cousins have this week been celebrating the 50th anniversary of the coronation of Queen Victoria. In this city the event was celebrated with appropriate ceremonies, in which all the natives of England took part.

The Pacific Rolling Mills of this city this week made the largest steel casting ever turned out on the continent. It proves that the Pacific Coast is making unmistakable advances in the mechanic arts, and that in the future there will be no doubts about our being able to build Government ships or other heavy work.

THE town of Copperopolis is about to undergo a mining revival. This Union copper mine is to be pumped out, with the object of working the mine. The copper interests in that section are valuable.

End of Volume LIV.

The MINING AND SCIENTIFIC PRESS is not only the oldest journal devoted to mining on the Pacific Coast, but in the whole United States. It has lived through all the ups and downs of mining history on the slope, and is still at its post as the representative of the industry. When its pages were first printed the mining area was small indeed as compared with this extent now being worked. During all these years it has recorded mining and metallurgical progress, as well as the industrial advancement, and bids fair to continue its labors for a long time to come.

The full and complete index on the last page of this number shows the variety and scope of the contents of the volume just completed. All interested in popular science, mining and mechanics will find that most subjects of general or special interest have been touched upon. We specially desire to call attention to the fact that all recent improvements in mining and metallurgical appliances, processes and systems have been described in our columns. Those who follow mining as a business can ill afford to be without a journal of this character, which brings before them the experience and ideas of others.

It is pleasant to note that our old subscribers remain with us, thus showing, in a material way, their appreciation of our efforts, and that new names are being constantly added. The publishers and editors endeavor in every way to carry on the PRESS in a practical manner so as to benefit its patrons to the utmost. Of late we have given more illustrations than formerly, and this feature it is the intention to still further enlarge. We shall be pleased to have the friends of the PRESS call the attention of others to its merits in order that its circulation may be still further increased and its influence correspondingly enhanced. This we can ask with confidence, feeling that all engaged in mining and industrial pursuits on this coast will be benefited by becoming readers of the journal which has so long represented their interests.

The One Thing Sure and Steadfast.

We asked our California land tillers, some six or eight weeks since, about how large a crop of our leading agricultural staples might be counted upon for the current year. We did not, of course, expect that anything more than approximate figures could be arrived at. An intelligent guess was the most that was looked for. Had such guess been attempted, the then anticipated yield of wheat would have exceeded by 25 or 30 per cent that which will be actually realized for the year. The falling off in the expected grape crop and, perhaps other of our land products will probably be about as large.

We allude to this condition of things as illustrating the uncertainties that, even in a fairly good year, attend farming pursuits in this State, these uncertainties being not much less in most other countries. And yet farming is everywhere regarded as being a proverbially sure business. While it must be conceded that money invested in land is apt to be safe, the proceeds of such investment are at the same time subject to great fluctuations, far greater in this country than is the output of our gold mines. If this has not always been the case, it has been because gold mining had in former days to be carried on under conditions far less favorable than those that at present prevail. We had to learn the business, a thing that required time and much costly experimenting. But, having learned the business, and learned it well, we are able to prosecute it with a steadiness of results such as attends hardly any other. The expert gold miner can make his calculations with more certainty than the merchant, the manufacturer, the fruit or the grain-grower. Less of the element of hazard enters into this branch of mining than into any of our other leading industries. The factors of success are here notably stable. The prospective stock of ore can within reasonable limits be arrived at. About what the mass of this ore will pay, and what it will cost to mine and mill it, can also be determined in advance. On the cost of plant, labor, transportation, etc., the miner can now figure very closely.

It was on data so fixed and easily ascertained that on the occasion referred to we based our estimate of the California bullion product for

the present year. We said then it would amount to very nearly \$19,000,000. That is what it will be. Nothing can happen to make it less. There may occur drought or floods, war, famine or pestilence, yet none, nor all of these, could much reduce the California bullion product for the current year, nor yet for any year in the near future. What is true of the conditions that now obtain will be true of them for many years to come. Not during this nor the next generation will gold mining in this State be more hazardous or less productive than it is at present. Further improvements in these respects may be rather looked for. It is destined to be, if not the longest lived, at least the most profitable and reliable of all our industries. Trade may be dull, factories closed and money tight; real estate may tumble, and bankrupts multiply, but this pursuit, sure and steadfast, will hold the even tenor of its way, little affected by the financial cyclones that carry disaster to so many other interests and industries.

California Powder.

Among the prosperous home industries of California are the powder manufactories, more especially those of high explosives. Most of the companies have very extensive plants, the main ones being on the bay shore of Contra Costa county. The largest black-powder works are at Santa Cruz. Immense quantities of the high explosives, in the composition of which nitro-glycerine enters, are made here and consumed on this coast in the mines and railroad works. Of late, however, the market for this powder has been extended, and large and regular shipments are being made to the Lake Superior copper mines, the Birmingham, Ala., iron mines, and other points where powder is used. The powder is shipped East in boxes as first-class freight. We get niter from Peru and sulphur from Japan at this port cheaper than they get those materials East. It is stated that about 4,000,000 pounds of powder are used every year at the Lake Superior mines alone.

Some powder has been shipped East from here before this, but of late much larger quantities are going forward. This is said to be owing to the breakage of the "powder pool" here. Powder can now be purchased much cheaper than was the case a few months since. The Eastern powder companies have a pool to keep prices up, and there being none here now, the product made here can be sold there. But this condition of things is not likely to last long.

The manufacturers of high explosives here have long had a good field. Their experience has enabled them to manufacture special grades for special service, and they have adapted their product to various kinds of work. The powder made is always fresh and good and up to the standard.

Foundry Notes.

The Pacific Rolling Mills made this week the heaviest steel casting ever attempted in this country. It was the stern post for the new Government cruiser Charleston. Preparations for the casting have been going on for several weeks. To make the casting, 30,000 pounds of steel had to be melted, two furnaces being used. The stern post, when completed, will weigh 15,000 pounds. It is L-shaped, 22 feet long on the keel and 20 feet high. The greatest width is five feet. The steel used was of course up to Government requirements and was carefully tested. It will be several days before the casting will be examined, but, so far as known, the process was successful. This event marks an era in our mechanical progress on this coast. The Government inspectors pronounce the steel made at the Pacific Rolling Mills as good as any they ever saw. Steel from all the heats is carefully tested by the appliances at the Union Iron Works, where the cruiser is being built.

The Union Iron Works are preparing to exhibit at the Mechanics' Institute Fair various pieces of the new U. S. cruiser Charleston, now being constructed at the works. The exhibit will include the largest driving shaft ever shown on this coast. There are now 400 men at work in the Union shipyard and 1100 men in the shops.

The Pacific Iron Works are now manufacturing the appliances used in the Rae electric system of working ores, such as are in use at the Douglass mill, Dayton, Nev. This system is to be introduced at other mills in Nevada.

Advancement of Science.

The thirty-sixth meeting of the American Association for the Advancement of Science will be held at New York from Wednesday morning, August 10th, until Tuesday evening, August 16th.

The trustees of Columbia college, at the request of President Barnard, have tendered the use of the several halls and offices of the college for the purposes of the association. As soon as the decision of the standing committee was known, the New York Academy of Science formed a special committee to forward the arrangements for this meeting and requested the co-operation of the various colleges, societies and public institutions in the city and vicinity. This co-operation has been given most heartily and several meetings have been held, resulting in the formation of a strong and representative local committee which has organized for the work to be done with a resolve that the first, but long-considered, meeting in New York shall be made a local success; and the standing committee believes that, with this cordial co-operation of so many representative citizens of the great metropolis of the country, the meeting will not only be an assured success, but that the facilities for reaching New York from all parts of the country, and the ample accommodations at hotels and boarding-houses, with the comfortable quarters at the college, will result in a larger gathering of members than at any previous meeting. The headquarters of the association will be at Columbia college, and all the offices and meeting-rooms will be in the buildings of the college. The hotel headquarters will be at the Buckingham hotel, Fifth avenue and Fiftieth street, one block from Columbia college.

Under the rule which took effect in 1884, members have the privilege of registering members of their families (not including men over 21 years of age) by paying the sum of \$3 for each individual to be registered. These associate members will receive badges entitling them to all the privileges extended to members generally by the local committee.

The meeting will be called to order in general session at 10 A. M. on Wednesday, August 10th, in the library of Columbia college, by the president, Professor Edward S. Morse of Salem, who will resign the chair to the president-elect, Professor S. P. Langley of Washington. After the adjournment of the general session, the sections will organize in their respective halls. In the afternoon the sections will meet and the vice-presidents will give their addresses. In the evening Professor Morse will give his presidential address. The general sessions and meetings of the sections will be held on the following days, except Saturday and Sunday, until Tuesday night, when the concluding session will take place.

The following are the officers elected for the New York meeting: S. P. Langley of Washington, president; Sec. A, Mathematics and Astronomy—Wm. Ferrel of Washington, vice-president; Henry M. Paul of Washington, secretary. Sec. 3, Physics—W. A. Anthony of Ithaca, N. Y., vice-president; C. Leo Mees of Athens, Ohio, secretary. Sec. C, Chemistry—Albert B. Prescott of Ann Arbor, Mich., vice-president; C. F. Mayberry of Cleveland, Ohio, secretary. Sec. D, Mechanical Science—Eckley B. Cox of Drifton, Pa., vice-president; Geo. M. Boud of Hartford, Conn., secretary. Sec. E, Geology and Geography—G. K. Gilbert of Washington, D. C., vice-president; T. B. Comstock of Champaign, Ill., secretary. Sec. F, Biology—W. G. Farlow of Cambridge, Mass., vice-president; J. Henry Comstock of Ithaca, N. Y., secretary. Sec. H, Anthropology—D. G. Brinton of Media, Pa., vice-president; F. W. Langdon of Cincinnati, Ohio, secretary. Sec. I, Economic Science and Statistics—Henry E. Alvord of Amherst, Mass., vice-president; W. R. Lazenby of Columbus, Ohio, secretary. Permanent secretary, F. W. Putnam of Cambridge (office Salem, Mass.); general secretary, W. H. Petter of Ann Arbor, Mich.; assistant general secretary, J. C. Arthur of Geneva, N. Y.; treasurer, William Lilly of Mauch Chunk.

THE Richmond Company of Eureka have been putting on more men lately, and are now doing a great deal of prospecting in their mine.

MANY applications for space have been made for the forthcoming Mechanics' Fair, and there will be many exhibits from interior counties.

The New Drydock.

The Union Works Ship-Building and Repairing Plant.

The Union Iron Works, at their extensive shops on the Potrero, have given a great deal of space to the ship-building and repairing plant. They built the first steel steamer ever constructed on this coast, and have others in course of construction, in addition to the great steel cruiser *Charleston* being built for the Government. They have arranged also to do repair work of all kinds for iron and steel vessels, not only on hulls, but boilers, engines, etc. Several steamers and ships are now being overhauled and put in order at these yards at present.

One of the principal accessories to this branch of their work is the new hydraulic dock, which was used for the first time last week in lifting the steamer *Arago*. We give a sketch of this work herewith. As will be seen by the engraving, the dock consists mainly of a large platform.

The total length of the great platform is 450 feet, width 66 feet, composed of 36 steel transverse girders 6 feet 4 inches in length with top and bottom flanges 24 inches wide and 1 inch thick connected with two continuous fore and aft girders at the sides each 5 feet deep and 3 intercostal girders running the full length of the dock.

The platform is planked between the girders, making a smooth and dry working floor over the entire surface. Upon the transverse girders are arranged the hinge blocks, made of laurel and held in place with bronze clamps supplied with ratchets, and rigging to move the pawls and place the hinge blocks in position. The keel blocks are also of laurel, firmly fastened in place and supplied with dogs and appliances to adjust the same to the height required. The platform with its appliances is lifted with 36 hydraulic cylinders, 18 on each side, one opposite each end of the transverse girders. Each cylinder contains a plunger with a vertical movement of 15 feet with a lifting power of 8000 tons, more than sufficient to lift the largest vessel in these waters.

The hydraulic cylinders are supported by 72 piers, each containing seven piles 14 inches in diameter and 100 feet long. The piles of each pier are incased in a steel caisson 50 inches in diameter and 30 feet long, reaching from below the mud line to low water. The piers are capped with cast-iron covers, which carry the girders of the frame, upon which the hydraulic cylinders rest. On top of each plunger a sheave is carried, six feet four inches in diameter, and grooved for eight steel ropes two inches in diameter. One end of these ropes fastens to the transverse girders and the other to the castings, forming the base of the hydraulic cylinders. There are 288 of these ropes, each 2 inches in diameter and 44 feet long.

The 36 plungers are lifted by hydraulic power. The simultaneous motion of each is maintained by a differential valve motion. The inlet valve is operated by the rotation of a screw and the outlet by the motion of the plunger. They are compelled to move in unison. Should the plunger move faster than the nut on the screw, it opens the outlet valve. Should the screw move faster than the plunger, it opens the inlet valve wider. The screws are operated by a pair of reversible engines.

The water pressure is maintained by a pair of vertical engines, 12 inches in diameter, 16-inch stroke, making 120 revolutions, the steam to which is regulated by the operation of the accumulator, which cuts off the steam from the

engines when up and opens it when down and is entirely automatic. These engines are geared for pumps, each four and a half inches diameter and three feet stroke and making 20 revolutions per minute. The weights upon the accumulator are graduated so as to suit the weight of vessel to be raised. When the platform is lifted with its load, 72 massive steel chocks operated by hydraulic power slide into place as an additional guaranty that no accident can occur. These chocks work in harmony with the plungers, a pressure being maintained at all times on them when the dock is being used. This dock differs from what is known as graving docks, as it only has to perform work equal to the exact load to be lifted; while in a graving dock the smaller the vessel the more it costs to dock the same, as more water has to be pumped out of the dock.

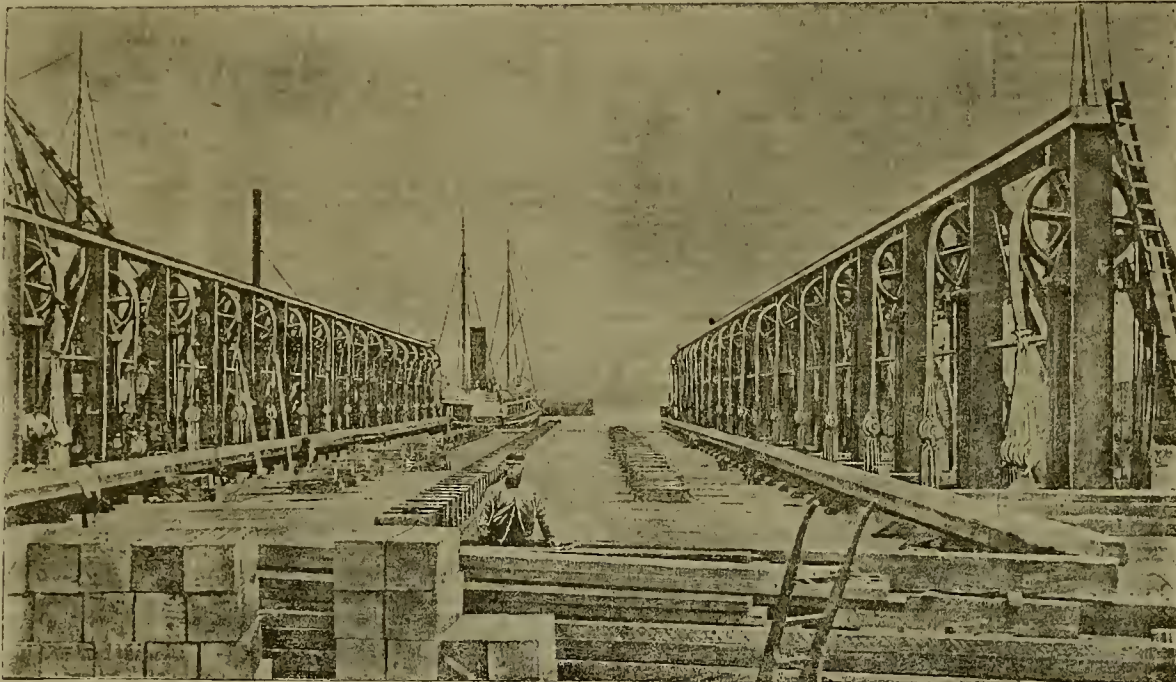
The dock was designed by and built under the direct supervision of Geo. W. Dickie, the expert mechanical engineer long connected with the Union Iron Works. It represents the greatest attempt to utilize hydraulic power which has been made in the United States. The dock cost upward of \$400,000. The Union Iron Works Company are supplying every possible accessory to have their plant first-class in every respect, and leave nothing wanting to have the

production of the Rio Tinto mines next year of 3500 tons, and eventually of 8500 tons fine copper, the total last year having been about 23,500 tons. Anaconda matte, amounting to 1865 tons, arrived in Liverpool last month. It is stated that about 1750 tons of bars and copper matte are awaiting shipment at the Belco mines, in Lower California, but the present production is only about 75 tons a month, four of the furnaces having been burnt out and consequently not available.

Congress of Geologists.

It will be remembered that some time since a plan was suggested of having a uniform system of coloring geological maps, which should be the same the world over. The matter will come up before the next session of the International Congress of Geologists, which takes place in London next year.

The American Association for the Advancement of Science will meet in New York from August 10th to August 16th. At that time the American Committee of the International Congress of Geologists (a committee appointed by the American Association) will present a report concerning the position to be taken by the representatives of American geologists at the next



NEW HYDRAULIC DRY DOCK OF THE UNION IRON WORKS.

most perfect arrangements of all kinds. The new dock is convenient in every way. It is so arranged that teams can drive on with supplies of material. The largest ships and steamers can be lifted. Already there are several jobs contracted for. The large steamship *City of Peking* will soon be lifted for repairs.

Copper.

James Lewis & Sons' ore and metal report gives the stocks of copper on hand in England and France as 46,131 tons. There are 7401 tons afloat from Chili and 1200 tons afloat from Australia. This makes a total visible supply on June 1st of 54,832 tons fine. The imports of copper into Liverpool, Swansea and London from 1st of January to date aggregate 25,743 tons, and into France 4054 tons, a total of 29,797 tons fine.

The table of imports of other than Chili copper into Liverpool and South Wales for the first five months of the year shows where their supplies come from outside of the Chili imports. From the United States the imports were 2963 tons; Canada, 3; Mexico, 47; Peru, 8; River Plate, 78; New Quebrada, 1138; Newfoundland, 343; Spain, 1500; Spain (precipitate), 4828; Portugal, 156; Italy, 369; Cape of Good Hope, 2757; Australia, 27; and sundries 213. This makes a total of 14,430 tons.

Last month Liverpool received 1368 tons of fine copper from Chili and 1851 tons fine copper from the United States. The effect of the diminution of 2139 tons on the stocks, made up in the middle of last month, was neutralized by the announcement of a probable increase in the

session of the Congress upon the more important questions of nomenclature, classification and coloring, which will there be discussed. The American committee has requested that at the meeting of the American Association, Section E (Geology) set apart a day for the purpose of considering a number of these questions to be submitted by the committee, and of aiding that body to ascertain the direction of American opinion thereon. In order to better accomplish this object, the committee has asked Section E to issue an invitation to all American geologists (whether members of the American Association or not) to attend this session and participate in the work.

Dr. Persifer Frazer, secretary of the American committee, 201 South Fifth street, Philadelphia, will give any desired information. The committee announces also that an opportunity is now offered for obtaining the great geological map of Europe, now preparing by a special committee of the International Congress. This map will be issued in 49 sheets, which, combined, will cover a space of about 11x12 feet. The price is \$20 a copy, with additional charges of duty and expenses amounting to about \$6. Incorporated scientific institutions are, of course, exempt from duty charges.

THE *Chico Chronicle* says: S. M. Rogers, whose discovery of a rich mine above Powelson was mentioned some time ago, has certainly struck a big thing. In a day and a half recently he took out 93 ounces—\$1674. Who says that Butte's mining days are past?

THE Wildman mine, Sutter creek, has shown up some very rich ore recently.

The Lumber Trade.

The establishment of new towns and rapid enlargement of old ones in this State, with the consequent increase in number of buildings, is having a good effect on the lumber trade. The mills everywhere on the coast are busy and are getting better prices for their lumber than for some time past. The demand at present is larger than the supply.

This is a fact that speaks well for the general prosperity of California. The effect of this demand for lumber is one which is felt all through the lumber regions, giving employment to thousands of millmen, teamsters, loggers, swampers, etc. It is of great importance, also, to the shipping interests. A considerable fleet of ships, whose names have been for some years identified with the wheat export trade, are busy carrying lumber. Besides these ex-wheat ships are the regular coasting fleet and several steamers. Not only are the coast lumber-mills running full time, but new ones are being built to meet the call for building material. New steam schooners are being built, and those which are available are kept steadily at work carrying cargoes. Steam tugs are being employed to tow schooners, so great is the haste for cargoes. Large quantities of lumber are going to Southern California and the demand at this port and all over the coast is much greater than it has been for years. Saw-mill machinery, engines, boilers, etc., are also needed, and the dealers are all busy.

The greatest difficulty just now is in scarcity of ships to carry lumber. In addition to what we use on this coast, immense quantities are now exported. In 1886 we exported by sea 131,431,322 feet of lumber. Of this, 106,178,673 feet was sent from Puget Sound, 8,000,800 feet from Humboldt bay, 15,352,449 feet from San Francisco, and 1,100,000 feet from Mendocino. Nearly half of the total amount was sent to Australia, the rest going to South America, China, South Pacific islands, etc. The lumber trade is greatly on the increase.

Coast Coals.

All the coast collieries are running on full time to supply the demand for coal, and will continue to do so, there being very little on the way here from England or Australia. The coast collieries are getting better prices for their product than for some time. There are certain grades of foreign coal, however, needed here for which high prices will have to be paid.

Just at this time there are some 60 vessels loading coal and lumber at Puget Sound for coastwise and foreign ports. Great quantities of coal which formerly came to San Francisco now go to Los Angeles and San Diego direct and is distributed from those points. Notwithstanding this, our receipts of coal are still on the increase.

California itself produces comparatively little coal, the Mt. Diablo and Ione coal mines being the only ones which yield much. There are several other localities where a little coal is mined, and a number of prospects are being opened. The bulk of our coast coal comes from Washington Territory and British Columbia, with some from Oregon. So far, our coast collieries produce no anthracite, although up at Tacoma they expect to find this kind of coal, from known indications.

A SITE for a ten-stamp mill, to be erected at the Alta mine, on the Comstock, is being graded just north of the shaft, below the waste dump. The stamps will be operated by steam-power from the hoist engine in the shafthouse.

MECHANICAL PROGRESS.

Loss of Heat From Uncovered Steam Pipes.

A very practical test to ascertain the loss of heat from uncovered steam pipes and those covered with different coverings, was conducted by L. A. Upson, superintendent, and Chief Engineer Steele, of the Hartford Carpet Company, with the following result:

A room having a very even temperature and free from draughts or air currents was selected, close to the boilers, where steam could be taken from the top of the main pipe, and free from water of condensation. A suitable vessel was arranged to collect the water of condensation, and connected to 120 running feet of two-inch steam pipe. A short section of the pipe was inclosed in a suitable box with a glass in this side for the purpose of reading the rise of temperature, as indicated by a thermometer placed therein.

Steam was first blown through the pipe and receiver until both were free from the water of condensation which was caused by heating the pipe and receiver. The valve was then closed, and 10-hour trials made, the water carefully collected and weighed, with the following results:

Each trial as given below was for 10 hours, 120 feet of 2-inch pipe. I, pipe uncovered; II, pipe covered with asbestos, hair felt and paper; III, pipe covered with plastic material:

	I.	II.	III.
Average steam pressure (pounds).....	79	77	80
Average temperature of room (deg's)....	70	69	70
Average temperature of box (deg's).....	167	80	107
Pounds of water condensed.....	362	222	480

It will be seen from the above that the loss by radiation greatly exceeds that usually estimated for uncovered pipes, but it agrees very well with trials made upon machines carrying high steam pressures. The saving by covering the pipes is very satisfactory, and in this second trial the temperature in the inclosed box was but little higher than that of the room.

Capabilities of Foremen.

One of the good qualities, and we might as well say the necessaries, of a foreman in any kind of business, says an exchange, is his capacity for seeing into things quickly when anything about the machinery breaks down. This is the case more especially when the shop or mill is at a distance from any professional D. D. M. (doctor of machinery). But anywhere, a man quick to see *how* and *where* a machine can be fixed up and kept running with very little delay, is worth his weight in gold (so to speak). If the part is so broken that it must come out, he will be able to tell on the spot how it ought to be fixed.

Once on a time the rocker arm to a Corliss engine broke, and the engineer was wild. The pattern was got out and sent to the foundry. The foreman was in a hurry, and asked the engineer how long before he could run again, at the same time picking up the broken part. "About day after to-morrow," replied the engineer. "Well," said the foreman, "do you want me to help you to get to running inside of an hour?" "Oh, yes; but I don't see how it is possible." Taking the broken arm in his hand, the foreman went to a blacksmith shop near and shrunk a ring on the projecting parts, and in less time than he asked the engine was running as good as new. The new arm came in two days from this foundry and was thrown under the bench, where it lies now. The mended arm was better than a new one.

An engineer asked this same foreman one time to help him drill a broken bolt out of a stuffing-box, saying he "reckoned" about 11 o'clock would finish the job. After supper they "went in," and in 15 minutes the old bolt was out and this new one in, and the ratchet drill and pile of rocks carried away. How was this? Why, enough of the bolt stuck out with a thread on it to get two nuts on and make a jam nut, and the thing came out "just as easy as nothing."

There are thousands of places where quick perceptions are worth more than long-winded study. Sometimes "heroic treatment" is just the thing, but it is not every man that can be trusted to handle it.—*Exchange*.

ALUMINUM SILVER ALLOY.—Alloyed with a small per cent of silver, aluminum loses much of its malleability, but with five per cent of silver it can be worked well, and takes a more beautiful polish than the pure metal. With three per cent of silver it is very suitable for philosophical instruments, being harder and whiter than the pure metal, and is not tarnished even by sulphureted hydrogen. With small amounts of silver, it appears very suitable for scale beams, and is now frequently used for this purpose. The alloy containing five per cent of silver has often been suggested for coin of small denominations, as it is hard, bright, and retains its luster in handling.

COLORING BRICKWORK.—For staining bricks a most satisfactory red, it is recommended that one ounce of glue be melted in one gallon of water, adding a piece of alum the size of an egg, then one-half pound Venetian red and one pound of Spanish brown. The color is to be tried on the bricks before using, changing light or dark with the red or brown, and using a yellow mineral for buff. For coloring black, asphaltum is

to be heated to a fluid state, the surface of the bricks being moderately heated, and then they are dipped; or a hot mixture of linseed oil and asphalt may be made, and the heated bricks dipped in the same. Tar and asphalt are also used for accomplishing this purpose. In carrying out these operations it is important that the bricks be heated to a sufficient degree, and that they be held in the mixture so as to absorb the color to the depth of one-sixteenth of an inch.

THE INTELLIGENT MECHANIC'S LABOR.—A group of gentlemen were discussing the necessity of brain labor in some life vocations, and, after allusions had been made to several well-known citizens who were successful and prominent in their professions, one of the speakers, himself a retired merchant and influential politician, declared that Blank, naming a draftsman and inventor employed in a large machine-tool manufactory, did more brain labor than any other man in the city. Some examples were cited of well-known mechanics, and the conclusion was reached that intelligent mechanical labor required as much solid thinking as any other way. The intelligent mechanic is not a mere walking machine. Materials are not always plastic; they are sometimes perverse, and judgment and calm consideration are required in their management. The parts of a machine, however closely planned, do not come together unaided and naturally, as eyestones converge in a sancer of vinegar; it requires headwork to "assemble" the parts of a machine of any kind, and nowadays, when mechanical work requires an accuracy of proportions and a nicety of dimensions, such as were not dreamed of a generation ago, the mechanic who is not brainy in his line will surely get left.—*Ex.*

BRIDGE-BUILDING.—There is said to be more bridge-work projected at the present time than ever before at any one time in the history of the country. Two are projected across the Hudson river; six across the Mississippi; two across the Missouri; two across the Ohio, and a ten-million dollar bridge across the Potomac, 4660 feet in length, beside a multitude of smaller bridges. These bridge works are constantly overrun with work, and manufacturers of bridge iron are said to be unable to accept all the business offered. Four new bridge-building works are said to be projected. This activity in bridge-building must be taken as still further evidence of the genuineness of the era of prosperity upon which the country has entered. These prospects seem to be flattering for almost every line of manufacturing industry. The only drawback appears to be the disposition of labor to make trouble. Let us hope, however, that even this disposition will work itself out ere long, and that it will not have the effect to turn back the tide of prosperity that is evidently spreading itself over the country.

THE SHOP COUNCIL.—Mr. James C. Bayless, of the *Iron Age*, has suggested in a pamphlet the institution of "shop councils" in which employer and employee are to be equally represented—the decisions not to be binding on either party unless approved by both, and all functions to be purely conciliatory. As a means of eliminating something of the element of secrecy from the relations of the two parties, of keeping petty matters out of secret discussion and decision, it seems all that can be desired. It is the antipode of compulsory arbitration, and it avoids that suspicion which often attaches even to voluntary arbitration. It is rather systematic than remedial, just as a general disease of the pistol pocket would be an excellent accessory to a law against street combats. It is a modest proposition; but even in the din of high-sounding schemes and associations, is it too much to hope for a fair trial of it somewhere?—*The Century*.

EIGHT HOURS A DAY.—In his recent very sensible address to workmen in Boston, Edward Atkinson said, respecting the proposed eight-hour system: "If you cut down the work in factories, in workshops and in the building trades to eight hours, you cut down the product. Then there will be fewer goods, fewer stores, fewer tools, fewer houses, and that means a higher price and higher rent." This is the doctrine that has been steadfastly preached in our columns for years past. The proposition to try to make men richer by reducing the hours of labor, and so reducing the amount of wealth created, is as stupid as would be a scheme for enlarging a water-power by cutting down the milldam.—*Textile Record*.

WORKMEN STATISTICS.—Bradstreet's has compiled very exhaustive tables on the number of workmen at present engaged in the various industries of the country, the wages paid them, and other highly interesting data, and the general results shown are very satisfactory. It appears from them that at least 400,000 more workmen are engaged than at this time two years ago, and that the wages, which had sunk very low in the two years prior to 1885, are at present about the same figures they were during the bright business year of 1881-82.

TOUGHENING STEEL.—If you're working a piece of steel and want to make it exceedingly tough, melt up two pounds resin, two pounds tallow and one pound Burgundy pitch; when your work is done heat up the steel—dull red—and dip in the mixture—warm, of course.

SCIENTIFIC PROGRESS.

Is Electricity Force or Matter?

The following letter appeared in the *Journal of the Franklin Institute* for June:

Dear Sirs:—Recently I have advanced the following argument to a number of electricians, and, having failed to find any one who can adduce any good argument against it, I thought it might be of sufficient interest to be discussed in your journal. Possibly it may not be new, but I have never seen it published elsewhere.

I believe it is conceded that everything in the universe is either force or matter; therefore electricity must be one or the other. If it is matter, it must remain the same in amount, and can never be consumed or generated. If it is force, it may be generated by the expenditure of another force—as that in the energy of a steam engine—and will then grow less in amount as it is again converted into other force—as in the energy of motors, lamps, or in heating wires. Now it is a well-known fact that quantity of electricity, measured in coulombs, never is generated, never is consumed, and never does grow less in the circuit, barring leakages. The current flowing out of a lamp is exactly the same in quantity as that flowing into it, the same being true of motors and of generators, showing that electricity itself is neither consumed while doing work nor is it generated; after doing work in a lamp or motor, it comes out in precisely the same quantity as it entered. Connect only one pole of a battery to a circuit and there will be no current. Why? This battery is not able to generate quantity, or coulombs, of electricity; all it is able to do is to take the quantity which flows in at the negative pole and to send it out at the positive pole, with an increased pressure or electro-motive force. The battery, therefore, does not generate electricity, but merely raises the pressure of that which flows in. Electricity, therefore, appears to be matter, but not force. It is precisely analogous to water in a water circuit. The water is neither consumed nor generated. The pump merely increases the pressure of the water which flows in at one end; the water motor or turbine consumes this pressure again, converting it into mechanical work of another kind; it does not consume the water. The quantity of water measured in units of quantity is the same in all parts of the same closed circuit of water, just as the quantity of electricity in an electric circuit. The work which an electric current can do is due to this pressure or electro-motive force; without pressure it can do no work. The electricity in the earth is like the water in the ocean—neither can do work unless raised to some pressure or height, or allowed to fall below its normal level.

The term force is used here as distinguished from energy, as the latter term might be construed to include in it the conception of matter. But even if matter and energy constitute the universe, the above argument applies equally well. It is understood, of course, that by the term electricity, as measured in coulombs, is not meant electrical energy, as expressed in watts or joules, for it is beyond question that this latter is energy.

Perhaps it will be found, at some future time, as has been already suggested, that electricity is the ether (which is believed to be matter) whose wave motions are light, and which, in some other form of motion, is an electric current. Perhaps a current of electricity is the bodily conveyance of ether, as distinguished from a wave motion, which is energy in the form of light. In that case, I would suggest that perhaps the relative motion of the ether of space and the revolving earth may explain the cause of the earth's magnetism, the ether in motion around the earth (relatively) being an electric current producing magnetic effects. The magnetic polarity and direction at the equator are in accordance with such a theory, and the fact that the lines of force bend down into the earth at the magnetic poles may be explained by the well-known fact that lines of force are continuous circuits; they must return somewhere, and they select the axis of the earth, as there is no motion there to develop a counter-magnetism. They cannot return outside of the earth, as lines of force cannot intersect each other, and, in order to return outside of the earth, they would have to intersect. Furthermore, observations show that they do not return outside of the earth.

The only plausible arguments which I can find against the theory that electricity is matter are that it may be a combination of force and matter, as, for instance, a wave motion; or, it may be, that the real current is in the same direction in both wires leading from a machine, therefore emanating from the machine, and consequently being force or energy.

CARL HERRING.

Philadelphia, April 10, 1887.

ASTRONOMICAL RESEARCH BY PHOTOGRAPHY. Mr. Isaac Roberts reports the successful photography of the minor planet Sappho. Scarcely any observations of this planet had been published since 1872, and hence Mr. Bryant, who is engaged in determining its orbit, appealed to Mr. Roberts to find the planet, if possible, by photography. The planet is not only very small—the 11th magnitude in brightness—but its motion in an hour is equal to 4.2 times its photographic diameter, and thus the photographic trail left does not exceed in

density that of a 13th magnitude star. With an exposure of one hour the trail of this planet was distinctly recognized, and the error of the ephemeris deduced from this photograph is in close agreement with several meridian observations made about the same time at Ducrechet. This is probably the first instance in which photography has been applied for this purpose. It is a distinct demonstration that asteroids of the 11th magnitude leave strong trails on the photographic plates, and indicate that, under favorable conditions, those down to the 13th or 14th magnitudes may be photographed. Another inference suggested by Mr. Roberts is that one astronomer could, in about three years' time, photographically discover all the asteroids existing down to the 14th magnitude.

Recognition of American Research in Astronomy.

Mr. J. W. Glashier, in his recent address as president of the Royal Astronomical Society of England, on presenting the gold medal of the society, remarked that this is the second successive year in which an American astronomer has shared the honor of receiving this medal. Last year it was awarded conjointly to Prof. Edward C. Pickering, director of the Harvard College Observatory, U. S., and Rev. Charles Pritchard, D. D., Savilian professor of astronomy in the University of Oxford, for their "Photometric Researches." Unaware of Prof. Pickering's comprehensive plan, Mr. Pritchard had also taken up the subject on a large and successful scale, and hence the joint medal, upon the award of which the president took occasion to designate Prof. Pickering's photometry as a "magnificent contribution to stellar astronomy, with which his name will in future be honorably associated."

This year, Mr. George William Hill, of the *Nautical Almanac* office, at Washington, receives the gold medal of the society for his researches upon the lunar theory. On account not only of the astronomical, but also of the distinctive and elegant analytical methods employed, Mr. Glashier is justified in giving the unusually detailed review in his president's address, and which consequently becomes an interesting resume of the present condition of the theory. Among the numerous and important additional investigations of Mr. Hill mentioned are those on the motions of Jupiter and Saturn, upon which he has already been engaged for nine years, and which will probably require three or four years more for their completion. These investigations will displace those of Leverrier, which now, in the case of Saturn, fail to represent adequately the observations, and, to use the words of Mr. Glashier, will constitute "the largest and most complete investigation of the kind that has yet been performed on the American continent."

ARTIFICIAL WHETSTONES.—The *Guide Scientifique* describes the following method of making artificial whetstones: Gelatine of good quality is dissolved in its own weight of water, the operation being conducted in a dark room. To the solution $\frac{1}{2}$ per cent of dichromate of potash is added, which has previously been dissolved in a little water. A quantity of very fine emery, equal to nine times the weight of the gelatin, is intimately mixed with the gelatine solution. Pulverized flint may be substituted for emery. The mass is molded into any desired shape, and is then consolidated by heavy pressure. It is dried by exposure to strong sunlight for several hours.

CHEAP ALUMINUM.—The demand for cheap aluminum has stimulated researches in every possible direction. Mr. James MacClear, in a paper before the Society of Chemical Industry, describes a new method for manufacturing sodium and potassium cheaply. As now made according to the Deville's method, aluminum depends upon sodium. With caustic soda at \$55 a ton, the metallic sodium costs about 25 cents a pound, allowing 17 cents for fuel and materials. With sodium at this price, aluminum can probably be put on the market at \$4 a pound, or about one-fourth of its present value.

SINGULAR PHENOMENON.—A curious story comes from Mackinaw, Ill. About six miles from the town is a spot of ground about 80 feet wide that will not freeze, and snow will not lie upon it. When the earth is disturbed it will flash like burning powder. The Mackinaw *Enterprise* declares that on the coldest days of winter one could walk on this particular spot and warm his feet in a short time. A peculiar gas comes up from the ground. An effort was made to confine some of it in a bottle, but in a very little while the bottle was burst into fragments.

AN AERIAL CAR.—A New York genius has invented a "vacuum car," with which he asserts his ability to navigate the air at a high speed and drop explosives with precision upon the decks of war vessels or in fortified places. Details of the invention are lacking in the letter the inventor has sent to the Navy Department, but the matter is deemed of sufficient importance to warrant inquiry, and an ordnance officer has been instructed to communicate in person with the inventor.

CELLULERT is a new material formed by passing paper, or any fibrous form of cellulose, through a bath of nitric acid. The glutinone surfaces so produced are pressed and washed, when they form an extremely tough substance,

The Boot and Shoe Industry of California.

The boot and shoe industry is one of the most important in the State. It was one of the products of the war. Before the war California shipped her hides by sea to Boston, and took them back in the shape of boots and shoes. When the depredations of rebel privateers rendered the high seas unsafe, the hides were kept here and rotted. To use them up tanneries were established, and subsequently shoe-factories, the labor employed in these latter being chiefly Chinese. Thus before the close of the war San Francisco had the credit of making the best mining boots worn in the United States. She has never lost that reputation.

As a general proposition it may be said that the trade of San Francisco in boots and shoes represents an annual value of \$6,000,000 to \$7,000,000. We manufacture about \$3,500,000 worth, and we import from the East—Massachusetts, New York and Pennsylvania, the lion's share belonging to Massachusetts—about \$3,000,000 more. These goods are not all consumed here. We supply Oregon, Washington Territory, Idaho, Montana, and to a certain extent British Columbia, on the north; Nevada, Utah and Wyoming, on the east; Arizona, New Mexico and parts of Old Mexico on the south, besides such islands as the Sandwich and several islands off Polynesia. The trade is constantly growing and cannot be taken away from us, simply because we make a better and cheaper boot than can be made elsewhere. In the East there are good shoemakers. Lynn turns out some conscientious work. But neither in the very cheap and coarse grades, nor in the very fine grades, which are the two classes of boots we import from the East, can it compete with the best work of this coast. We make a better boot for less money. Why this is we cannot explain. But neither can any one explain why California makes better blankets than New England. We must be content with the fact.

There were received in San Francisco, in 1836, 73,077 cases of boots and shoes, against 42,066 in 1835, 40,508 in 1834, 55,501 in 1833, and 65,958 in 1832. Of hides, 190,676 were received last year, 178,589 in 1835, 190,368 in 1834, 223,941 in 1833, and 269,431 in 1832. The main source of supply is the Pacific slope, whence 150,018 were obtained last year. The Hawaiian islands sent 16,304, and Mexico, 13,660. The market during the year, especially the latter part of it, was very steady. It opened at 9½ cents for wet salted and 18 cents for dry, and closed at 9½ cents for the former and 16 to 16½ cents for the latter. The receipts of leather for 1836 were 5,223,660 pounds, against 4,466,740 pounds in 1835, 4,695,470 in 1834, 5,459,840 in 1833, and 5,957,070 in 1832. It will be seen that the receipts last year were the largest since 1833. Prices in 1836 were five per cent less than in 1835, and as much money was made in the later as in the earlier year. The Northern and Southern California trade has been good. Los Angeles buys largely in the San Francisco markets of sole and harness leather.

THACKERAY'S HATRED OF HYPOCRISY.—Of course in all families the mother is the one to whom the children cling. We don't talk to them, feel with them, love them, occupy ourselves about them as the female does—we think about our business and pleasure, not theirs. Why do I trouble you with these perplexities? If I mayn't tell you what I feel, what is the use of a friend? That's why I would rather have a sad letter from you, or a short one if you are tired and unwell, than a sham gay one, and I don't subscribe at all to the doctrine of "striving to be cheerful." *A quoci bon*, conclusive grins and humming-god humor? Let us have a reasonable cheerfulness and melancholy, too, if there is occasion for it, and no more hypocrisy in life than need be.—From "Unpublished Letters of Thackeray," in Scribner's Magazine.

CARRION AND CONTAGION.—The *Chronicle* makes a pertinent paragraph applying Ohio experience with the distribution of hog cholera from the dropping of choleric pork from unhurried carcasses by crows. This infested substance may fall in fields where healthy animals are pastured and infect them with the cholera germ. The preventive is, of course, to bury dead animals beyond reach of carrion-eating animals which might bring it to the surface for carrion birds to fly away with. Attention is called to the numbers of carrion birds on this coast, and therefore the greater danger of distributing infection. It is desirable either to burn dead animals, or, if this be not easy, bury them deeply. This will make the air purer, as well as guard against evil work by the birds.

A WARNING TO NIBBLERS.—A young man in Healdsburg, the other day, stepped into a business house, and seeing some wheat lying on the counter, picked some up and ate it. Noticing a peculiar taste left in his mouth, he turned to the proprietor and inquired the cause. Imagine his consternation when he was told that the wheat had been soaked in a solution of poison for the purpose of killing squirrels. Emetics were quickly administered and the young man's stomach relieved of its dangerous contents before any serious results were experienced. This should be a warning to all those who are in the habit of tasting things carelessly.

USEFUL INFORMATION.

DIAMOND INK—A VALUABLE PREPARATION.—The preparation for writing on glass, called "diamond ink," is to be used with a common pen, and at once etches a rough surface on the parts of glass it comes in contact with. It proves to be a very useful article for labeling bottles which are to contain liquids that will destroy common labels. At the request of Professor Maisch, an analysis was made which proved it to be ammonium fluoride, barium sulphate and sulphuric acid. The barium sulphate seems to act as an absorbing medium, and when this semi-fluid mass is used it makes a white mark and prevents the spreading of the watery liquid; it also seems to make the acid etch a rougher surface. It is made by mixing barium sulphate three parts, ammonium fluoride one part, and sulphuric acid a quantity sufficient for decomposing the ammonium fluoride and making the mixture of semi-fluid consistency. The sample examined was contained in a glass bottle holding nearly two fluid drams, and which was thickly coated on the outside with asphaltum, on the inside with a thick stratum of beeswax, and was stoppered with a rubber stopper. It is claimed by the manufacturer that the mixture contains no hydrofluoric acid and does not corrode a pen; but of course it does corrode a pen, and hydrofluoric acid is the one thing that does the etching. Any one making this mixture and wishing to keep it in a glass may coat the bottle inside with paraffine, beeswax or rubber. It should be prepared in a leaden dish and is preferably kept in a gutta percha or leaden bottle.

PRESERVATIVE QUALITIES OF SEA-WATER.—The capability of sea-water as a preservative is shown by the fact that among the articles recovered from vessels sunk in the harbor of Vigo, Spain, in 1702, there have been recovered specimens of logwood and mahogany that, notwithstanding their 184 years' submersion, are in the most perfect state of preservation. The mahogany, too, is very fine and solid, one log 12 feet long and 22 by 32 inches square being subsequently worked up in the shape of furniture and walking-sticks as mementoes. The chief object of interest, however, is an ancient pulley block 4½ feet high and 3 feet broad, with four solid copper sheaves 18 inches in diameter. It is of solid oak, and was probably used in hoisting heavy articles of merchandise or the anchors. The wood is perfectly preserved, but an iron band is completely corroded away, while the copper wheels are but slightly oxidized.

DEALING WITH LARGE MASSES OF STEEL.—The steel manufacturers of England, who have never yet failed to produce any work called for, have recently begun to make extensive preparations for dealing with still larger masses of that metal, mainly by means of the forging press. Messrs. Watson, Moorwood & Co., of Sheffield, have recently manufactured a huge anvil block, weighing 35 tons, constructed so as to withstand an enormous pressure. Taking into consideration the great size of the casting, it is said that the work has been admirably executed. A second anvil block has also been manufactured, and at last reports was undergoing the cooling process. Messrs. Bolckow, Vaughan & Co. have set up works which allow of their production of plates up to 3 tons in weight, 40 feet in length, 8 feet in width and 4 inches in thickness. The plates are constructed of basic steel.

CARRIAGE PAINTING.—A correspondent of the *Carriage Monthly* asks the editor for a good recipe for mixing body rough-stuff out of Reno's umber and orange. The editor applied to Reno Bros. for the information, and their response contained the following recipes, with the further remark that many painters had various ways of mixing rough-stuff, the rules below being as near right in general use as any: For rough-stuff, take equal parts of good japan and coach rubbing varnish. Pour together and add enough of the French number filler to bring it to the consistency of a thin paste. Thin with thin turpentine. For priming and lead coating, use French number filler. Mix with oil to the consistency of keff white lead, and use the same as lead. For putty and glazing, mix with japan and varnish to the consistency required.

GLASS FLOORING.—The substitution of glass flooring for boards continues to increase in Paris, this being especially the case in those business structures in which the cellars are used as offices. At the Bank of the Credit Lyonnais, the whole of the ground in front is paved with large squares of roughened glass, embedded in a strong iron frame, and in the cellars beneath there is sufficient light, even on dull days, to enable the clerks to work without gas; and, although its prime cost is much greater than that of boards, glass is, in the long run, far cheaper, owing to its almost unlimited durability.

EARLY USE OF MAHOGANY.—It is said mahogany was first known to Europeans through the fact that Sir Walter Raleigh, when at Trinidad, in 1595, used planks of it to repair one of his vessels. The samples thus carried to England were much admired, but for over 100 years it was put to no practical use. In 1720, however, a Dr. Gibbons, of London, received a few mahogany planks from a friend in the West Indies, and employed a cabinet-maker to work them up. From that time to the present the

wood has been a staple article of commerce. So far, the supplies have practically all come from Spanish America, but there is some possibility that other sections may contribute to the supply. Mahogany, though of an inferior quality, has been shipped from Africa, and certain parts of India have proved to be adapted to its growth. Mahogany is of slow growth.

WILD GESE DESTROY A KITE.—A harrow-shaped flock of wild geese, the Waterbury, (Conn.) *American* says, went northward over the city recently. They seemed to attend sharply to the business of traveling until they spied one of the numerous kites the boys in the northern portion of the city were flying. This kite was uncommonly high in the air, and the geese objected to it. At least they circled about it two or three times, and then four of their number, delegated for the purpose, attacked the kite and tore it into shreds, and went on their way.

STEEL OARS.—Yates & Co., Birmingham, are making an oar in which the blade is made from the best sheet steel, highly tempered. It is said to be much stronger than the ordinary wooden one, and cannot be broken without undue violence. The handle fits into a socket running nearly the whole length of the blade, and forming a backbone of great strength. The oar being much thinner in the blade than the wooden one, enters and leaves the water cleaner. The handle is made separately, of the ordinary spruce or ash, and if broken can be readily replaced.

SMELTING BY RADIATED HEAT.—Dr. Werner Siemens' new copper works in the Caucasus have a furnace in which the heat is derived solely by radiation from petroleum and steam spray flames. These flames are not in contact with the walls of the furnace at all, and everything depends upon radiation; but the naphtha or petroleum employed will melt from 15 to 20 times its weight of ore. Dr. Werner Siemens says that it is the first large smelting furnace in which the Siemens radiation method has been applied in practice on a large scale.

TO FILL CRACKS IN FLOORS.—A very complete filling for open cracks in floors may be made by thoroughly soaking newspapers in paste made of one pound of flour, three quarts of water and a tablespoonful of alum, thoroughly boiled and mixed. Make the final mixture about as thick as putty, and it will harden like papier mache. This paper may be used for molds for various purposes.—*Cal. Architect.*

For some time past builders in Germany have resorted to the use of a composition of cork, sand and lime, molded into bricks, for the construction of light partition walls. This is said to exclude sound better than ordinary brickwork, while being light and a good non-conductor of heat.

RUBBER JOINTS.—In making rubber joints, chalk the rubber well before screwing up the flanges—it will always come apart easily, and can be used many times even if hard by renewing the chalking.

GOOD MEALTH.

The New Treatment for Consumption.

A novel method of treating patients suffering from phthisis is described in a recent number of the *Medical Record*. It was devised by a French physician, Dr. Bergeon, of Lyons, who has been applying it for two years to cases of chronic pulmonary and throat diseases. The results are said to be remarkable. In acute general phthisis there has been an arrest of the progress of the disease and a cure in a few months. In advanced consumption marked improvement of symptoms is rapidly secured, night-sweats ceasing and the cough becoming less harassing. Two hundred cases have been treated with singular success by Dr. Bergeon in Lyons, where the climate is unfavorable for consumptives. His method has been introduced in the hospitals there and in Paris, and the medical authorities are favorably impressed with it.

The treatment consists of daily injections by enema of medicated gases. Carbonic acid gas when introduced into the system by this method is found to be painless and harmless. Sulphureted hydrogen is mingled with it, the entire structure of the lungs is permeated by the medicated gas, and remarkable curative effects are observed. The carbonic acid gas is practically inert when taken up by the veins of the intestines, but the sulphurous gas reaches every particle of diseased tissue in the lungs and throat, which is eliminated from the system in the process of expiration. The volume of gas used is very large. At the outset a single litre is introduced, but the quantity is rapidly increased to 10 or 12 litres for each injection.

The results of this new system of treating consumption are so well vouched for that we commend the subject to the critical examination of medical circles in this country. Consumption is the chief scourge of the Atlantic seaboard. Any departure in therapeutics so radical as this French method deserves to be thoroughly investigated and adequately tested in American hospitals. Dr. Bergeon is not a smatterer in medicine, but a reputable physician of large practice and good standing. If

his method be as effective and successful as he asserts, it merits general attention from the profession in the United States.—*New York Tribune.*

THE GERM THEORY OF DISEASE.—The theory that many diseases are produced by microscopic germs is generally supposed to be wholly a modern one; but some book-worm has recently unearthed the fact that the first statement of the theory was really published more than 150 years ago, by Doctor Guiffon. In a work by this author, entitled "Origin of the Plague," published in 1721, he says: "Minute insects or worms alone can explain these diseases. It is true they are not visible, but it does not therefore follow that they are non-existent. It is only that our microscopes are not at present powerful enough to show them. We can easily imagine the existence of creatures which bear the same proportion to mites that mites bear to elephants. No other hypothesis can explain the facts. Neither the malign influence of the stars, nor terrestrial exhalations, nor miasmata, nor atoms, whether biting or burning, acid or bitter, could regain their vitality, once they had lost it. If, on the other hand, we admit the existence of minute living creatures, we understand how infection can be conveyed in a latent condition from one place to break out afresh in another."

PHYSIC-TIFFLING AND MEDICINE-BIBBING.—At a recent State Sanitary Convention, held in Philadelphia, Dr. Frank Woodbury of that city read a paper with the above title, in which he referred to the rapid increase in the consumption of such drugs as the bromides, chloral, opium, etc. It is said that of chloral hydrate, one ton a day is consumed in England and America. He then spoke of the causes of this increase. A large portion of the death-rate among children was attributed to the abuse by the parents of medicines acting on the nerves. The injurious effects of patent medicines were considered. The author advocated as a remedy for this growing evil, "the instruction of the public to properly estimate drugs, and to regard every unknown medicinal agent as dangerous and endowed with capacity for harm. Let them escape the caustic criticism of Moliere upon those who pour medicine about which they know little into bodies about which they know less, in order to cure disease about which they know nothing at all."

HYDROPHOBIA FROM MILK.—It has not hitherto been known that hydrophobia may be communicated through the medium of milk; but from the following note from the *Anti-Adulteration Journal*, it appears that the disease may be communicated in this way: A dog belonging to A. J. Hall went mad last week, and among the animals which it wounded in its wanderings about the farm was a milch cow. The cow showed no signs of being affected by the wound. Later, however, the animal began showing symptoms of hydrophobia, and at the same time the farmer's two little children, who had been nourished with the cow's milk, exhibited similar symptoms, and are in a most critical condition, suffering the most terrible agonies. The other members of the family are also ill, but their symptoms are not so alarming, and hope is expressed that they may recover.

DANGER FROM HOUSE PLANTS.—Dr. Sanbury found malarial fever to be propagated among persons sleeping in a room in the windows of which had been placed a box of earth from malarious soil. House plants cultivated in pots filled with malarious earth are a constant danger. The germs grow luxuriantly in the moisture and warm air of closed rooms. Dr. Eichwald, Professor of Clinical Medicine in the University of St. Petersburg, has given to the public facts concerning a patient of his—a lady with malarial fever—who was easily cured by treatment when confined to her chamber, but who quickly relapsed on remaining during the day in her parlor. The easy cure and constant relapses went on for a long time. At last the doctor, having become suspicious of the flower-pots, removed them from the house, and there was no further recurrence of the disease.

BACTERIA.—It has been estimated that a single cubic inch of space will contain 8,000,000,000 of these little fellows, of average size. They also increase, by fission, at the rate of one division every hour; hence, a single one becomes the immediate parent of 16,777,215 every 24 hours, and the causative parent of 32,307,756 individuals in that length of time. Now, as each one of these 32,000,000 will become, during the next 24 hours, the hegetter of 32,307,756 individuals, one can get a reasonable understanding of the virulence of some of our infectious diseases where there is a specific bacterium.—*Sel.*

THE LIFE-HABITS.—The life-habits of people who have come to be centenarians are described in an interesting article in the *British Medical Journal*. Activity, out-of-door exercises, and early rising with moderation in diet, seem to be the most important factors of longevity. Few things tend to promote health and vigor more than activity—activity without excitement—an activity which does not wear the body out. The candle ought to burn briskly, and, as a general rule, at both ends, regarding the head or brain as one and the limbs or locomotory agents as the other; but it should not burn too fast.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

PLYMOUTH.—Cor. *Amador Dispatch*, June 18: It is reported that the Alpine mine has been sold to an English company for \$80,000. The mine has been resurveyed and work commenced. It is the intention to sink a new shaft on the ledge, east of the old shaft. The New London is pushing ahead with its second shaft, which is now down about 100 feet. Everything about this mine is booming, showing the pluck and energy of the owners. The Empire and Pacific are running 160 stamps and still hold the imperial star in the production of bullion in the Golden State. The mining outlook for Plymouth and vicinity is that of rapid progress, and it will not be long before northern Amador will show the outside world that we surpass all other mining camps in abundance of rich ore and production of bullion.

EL DORADO.—*Ledger*, June 18: This quartz claim is located near Amador City, and adjoins the Median on the south. It is owned by Dr. T. H. Mayon, who has prosecuted its developments as rapidly as his means will allow. A shaft was sunk a couple of years ago, 290 feet, and a drift was started south. The developments were highly satisfactory, when work was suspended for lack of means. Lately operations have been recommenced and the drift has been extended 125 feet from the shaft, in ledge matter all the way, and apparently widening as progress is made. At the face of the drift the ore body is 7 feet wide, and the rock is of that dark-streaked ribbon quartz which is the infallible indication of a healthy gold-producing ore. The quartz is similar to that of the South Spring Hill and Keystone. Assays made from the average grade of ore gave a result of \$12.45 per ton. From its appearance it ought to yield from \$8 to \$10, by mill process. It is the intention of Dr. Mayon to erect a mill on the property this summer, if possible.

MISCELLANEOUS.—The Original Amador was started again last week, and the Bryan roller-mill is running full blast. The rock is coming from the shaft, and is said to give better results than that first crushed. The mill reduces 10 tons per day. The Alpine mine at Plymouth has been started by an English company, after a long period of idleness. A gentleman representing the English owners, arrived in Plymouth a couple of weeks ago, and at once made preparations for the resumption of work. A few men were put to work this week in starting a new shaft.

Calaveras.

WEST POINT MINES.—Cor. *Calaveras Chronicle*, June 18: The mining boom here rules the hour, and is attaining greater proportions as time progresses. Never in the history of the camp has there been witnessed such a stir in mining circles, thus proving to the world that this granite camp contains some of the richest mines in the State, and that to-day it is the liveliest mining camp in the county. A company has been organized, with a capital of \$500,000, to erect reduction and chlorination works here. The site has been selected near the town.

LOCKWOOD MINE.—Development is still progressing in this mine. Three hoisting works are kept in motion. The south level of the north shaft is now 180 feet in length, with four-foot ledge in face. The size of ledge in this level ranges from two feet to 6½ feet in width, with an average value of \$100 per ton. South shaft contains an ore body of sulphurets 150 feet in length; value of ore \$150 per ton. This is the chief mine of the district.

BLAZING STAR is proving itself second only to the Lockwood. The mine was purchased by Moore & Co. of San Francisco, last March, from George Eberhardt, the price paid being \$3500. Mr. C. W. Watkins took hold and commenced sinking a double compartment shaft on the first of April, and after the shaft had reached a depth of 60 feet, a 30-horse power engine was placed in position and sinking again resumed. The shaft is now 140 feet in depth, with 60 feet of backs. The ledge in the shaft is two feet in width; value of ore ranging from \$200 to \$3000 per ton.

KELTZ.—Work of extracting and shipping ore from this mine continues. Value and volume of ore in stopes and lower levels show no diminution. This mine pays its regular dividends. Twenty men are employed.

SCORPION.—The work of stopping good ore is kept up at this mine, and the five-stamp mill is kept constantly in motion. A splendid body of ore has been struck in the north level, which adds greatly to the value of the mine. As sinking of 200 feet will be commenced in July, 200 tons of concentrations have accumulated from the new mill. They will be worked by the new reduction works.

EASTERN BOUNDARY.—This mine is near the Keltz. They have a shaft 150 feet in depth, with good backs. Stopping has been commenced, and is turning out splendid ore. Some of the sulphurets will assay as high as \$600 per ton. They employ 12 men.

SOAP ROOT.—This mine is owned by John Henry, and has a first-class record. Mr. Henry has bonded the mine to a San Francisco company for \$12,000. Thirty tons of sulphurets were worked at Selby's Works, Vallejo Junction, last summer, which netted \$3970, and the best ore may be found in bottom levels. The New Tucker has been bonded to Moore & Co. A large shaft is being sunk, over which first-class hoisting works will be erected in addition to a Stewart pulverizer. The Water Lily has been bonded for \$20,000. The shaft is 140 feet in depth. The Sterling mine, owned by Henry Sterling, has been bonded. Good hoisting works will be erected. This mine, like the Water Lily, is situated close to the Blazing Star. The Riverside mine, owned by Frank Ochoa, has been bonded to a S. F. company for \$5000. This mine has a splendid record. The Texas mine, owned by L. Davidson, has been bonded for \$3000 to certain parties from San Francisco. This mine is located near the Riverside. The Austrian John mine was sold for \$2000 cash down, to-day, to Knox Bros., of San Francisco. They will put up hoisting works on the mine. There is a splendid sulphureted ledge in bottom of main shaft.

MINING REVIVAL.—*Calaveras Prospect*, June 18: The town of Copperopolis is about to undergo a

mining revival. The Union copper mine is to be pumped out with the object of working the mine. The copper interests in that section are valuable. The Burger mine at Campo Seco is looking well of late. Last week a new Burleigh drill was put into the mine, and a good cleanup is expected in the mill this month. The gravel claim between El Dorado and Cave City has suspended operations until next fall. The cleanup at the Wyllie claim netted over \$3000. The Riley Bros. made equally as good a cleanup in their claim. Geo. Babcock, a well-known mining expert, who has mining property in Railroad flat, has bonded the Phillips mine, near Gwin mine. This gentleman was at Valley Spring last week, and while there, visited the Emma mine, of Plummer, Bratton and Brown, and was well pleased with prospects, and says the proprietors have a good mine. Messrs. Plummer, Brown and Bratton have a fine prospect for a quartz mine, one and one-half miles from Valley Spring, near Chili camp. They have been working since January last. There is a shaft 40 feet, and a drift 70 feet. The vein averages about 3½ feet in the shaft and drift. The owners have some fine specimens they have taken out lately; only last week a fine body of ore was struck in the drift, which contained considerable free gold.

NEVILLE MINE.—*Mountain Echo*: On the 400-foot level work has but recently been commenced in the drift running south. The drift is in good ore 80 feet, and particularly in the end where stoping has just commenced the ore has been found to be of a high grade, carrying free gold and sulphurets far superior to that found on the upper levels. At this point walls on either side have not been reached, but as far as developed a well-defined ledge, 15 feet in width, is presented. The ore lies in strata enclosed in narrow casings of slate varying in width from one-half to two inches and of a green-stained character. The best ore taken out of the mine is now being extracted on this level, a fact which plainly shows that the ore increases in richness as the mine goes down. In the south end of the 300-foot level stoping is going on actively. The stopes are opened up in good shape and the Burleigh drills are doing considerable execution. On the 200-foot level stoping is going on briskly in the north end. Considerable work has been done in the stopes of this level in the way of filling in with waste and surface earth as the ore is extracted. Material from above for filling in is transmitted through an upraise recently made to the surface. Filling in is going on quite lively, thus necessitating little or no timbering. This method of securing the mine is in itself a great saving in the cost of timbers, and in fact makes the mine safer and at the same time keeps the ore body in reach so as to be worked to advantage with the Burleigh drills. The shaft, from the surface to the 400-foot level, is in ore the entire depth, there being sufficient now in sight to keep the 20 stamps running for ten years, to say nothing of what lies beyond the 400-foot level. The mine is paying a handsome dividend. There are 35 men on the payroll at present.

Mono.

ORE.—Cor. *Inyo Register*, June 18: Up the Furnace canyon Hugh Jones is preparing to ship a carload or two of ore. Somerville & Buechler also have about a carload ready from the Coalburner. At Montgomery John Schlummer is taking out some rich ore from his mines. Returns from a shipment made a few weeks ago by him to the Reno Reduction Works were very satisfactory.

Nevada.

DELHI.—North San Juan Times, June 18: We saw a gold bar at D. Furth's store the other day from the Delhi which was worth \$9000. The gold was taken from the screens only of the Delhi mill during the run from June 1 to June 9, inclusive. The receipts from the Delhi for May amounted to \$22,100—obtained from an 8-stamp mill at a working expense of \$1400 only. With a 40-stamp mill, it is fair to presume, the receipts for the month of May would have been five times greater than they were.

PROSPECTING.—*Nevada Transcript*, June 18: Our correspondent at Omega sends us the following interesting mining items: There is a boom in prospecting for quartz in this section, in fact in the whole township "the woods are full of 'em," and all sure of a fortune. S. O. Pease & Co. have a big ledge showing fine-looking quartz. Jas. Teramer and Mr. Eastman have just started a tunnel to strike a big ledge located a short distance south of the Chase hotel at this place. A. Tregidgo & Co. have finally purchased from Towle Bros. of Alta the fine 20-stamp quartz-mill formerly erected on the Celia mine at this place, and on Monday last commenced tearing it down preparatory to removing it to the old Baker mine on the Yuba river, opposite the mouth of Canyon creek. At this mine there is now on the dump not less than 500 tons of fine-looking ore ready for crushing. The mill now being moved to the mine will be rushed to completion. Mr. Tregidgo is also engaged in putting up hoisting works on the Blue Bell mine farther up the river. A good deal of prospecting is being done on Canyon creek. There are a number of good-looking ledges there, but none sufficiently developed to show real value as yet, with the exception of B. J. Watson's mine. He has some fine-looking ore on the dump and a shaft down on the ledge over 160 feet deep, carrying a fair sized vein of ore all the way down and favorable-looking rock. All indications are favorable for its making a good paying mine. Messrs. Kohler & Harris of Washington have fine prospects on the creek not far below Watson's mine. On Gaston ridge Messrs. Cole & White, residents of Washington, have a rich find. They have a shaft down on their ledge only about 20 feet, the rock showing very rich in free gold and galena. The lucky owners have already had an offer of \$10,000 for their property, which was refused.

Placer.

FOREST HILL DIVIDE.—*Placer Herald*, June 18: Supt. Dodge reports that gravel was struck in the upraise of the Baker Divide tunnel last Sunday night, 330 feet above the tunnel. So far they have been unable to prospect on account of water. A horizontal drift will be run to lead the water off. The tunnel is in 2400 feet. Mr. Dodge thinks it will have to be extended 1000 feet, as the bedrock pitches away from them at a very small angle according to present indications. The finding of gravel at Red Point, and by the Baker Divide Co., opens a new era in mining on the Forest Hill Divide. These two tunnels were run to test the theory that an old channel

followed the trend of the Divide from a point above Damascus down to the Mayflower mine; and the striking of gravel in both has proved the theory to be correct. The successful issue of these two costly undertakings will encourage other companies, invite capital and population, and place the old Divide in the front ranks of rich mining centers.

San Diego.

MANGANESE.—*Julian Sentinel*, June 17: We were shown a sample of black manganese in McNamara & White's office, San Diego, which has all the appearance of warranting a very rich claim in the vicinity of the Cuyamaca.

Shaeta.

LOWER SPRINGS.—*Reading Free Press*: The Eureka, Eastern Star and White Oak mines are the only ones being prospected at the present time. Prospectors have fallen off during the past month. Their anxiety to find good mines with little or no labor has worn them out. At the bottom of the shaft in the Eureka mine, some very rich ore has been encountered. The shaft is down 40 feet, pitching at an angle of 30 degrees. Fifty feet north of the croppings on which the vein is being done, runs the main ledge, and pitches at an angle of 65 or 70 degrees—both running parallel with each other, and both pitching north. While sinking the above-mentioned shaft, six tons of ore were extracted, three tons assaying on an average of \$239.40 per ton, and some of the ore at the bottom of the shaft is equally rich.

Sierra.

EMPIRE.—*Mountain Messenger*, June 18: The Empire Mining Co., at Gold Valley, are working from 25 to 30 men putting up buildings, etc. They have just got their new sawmill started, and will now be able to supply lumber as fast as it is wanted. L. Foss has bought an interest of D. E. Williams in the quartz claim, situated on the hill above the old Frank Beaver place. The Grand Hill Drift Mining Co., near Gibsonville, has found gravel that pays \$3 per carload. Cox, Gourley and others are the owners. The thousand-foot contract at the B. M. Ex. new tunnel, three miles up the ridge above Forest City, is about completed. Good paying gravel has been found in the Bunker Hill claims at Little Grizzly.

Sonoma.

THE CHROME IRON MINE.—*Sonoma Democrat*, June 18: Six men will be employed in opening the chrome iron mine deposit on the Yarbrough ranch, near Guerneville, next week. Mr. Ludwig is firm in the belief that he is the owner of a rich mine, and if such proves to be the case, it can be said to be the most advantageously located for shipping facilities of any in the State.

Trinity.

LEASED.—*Journal*, June 18: We understand that San Francisco parties have leased the Blythe mining property above Trinity center for five years, with the privilege of purchasing at the expiration of the time for \$35,000.

MINE BONDED.—Messrs. J. H. Underwood and G. W. Tinsley have bonded the Taylor flat mining property to Mr. Wm. H. Vaudray, of Manchester, England. The bond runs till December, and 20 per cent of the purchase price was paid on the bond. The Van Matre Bros. have recently made a satisfactory crushing of rock from the Last Chance which they have leased, and are reported to have made another rich find in the same mine.

NEVADA.

Washoe District.

CON. CALIFORNIA AND VIRGINIA.—*Enterprise*, June 18: On the 130 level a west crosscut (No. 2) from the south drift was advanced 35 feet; total length, 234 feet. This crosscut continues in quartz and vein material. Are still continuing the upraise above the northeast drift which is intended for an airway. On the 1400 a west crosscut (No. 3) started in the Consolidated Virginia shaft was advanced 25 feet; total length, 48 feet. The north drift started from the bottom of winze No. 1 has been advanced 30 feet; total length, 150 feet. This drift still continues in low-grade ore, containing streaks of fair quality. Still extracting the usual amount of ore from the new south stopes. Have discontinued injecting carbonic acid gas. It is supposed that the fire that was smoldering in the bulkheaded portion of the mine is now extinguished, and this part of the mine, so long closed, will soon again be opened up for the extraction of ore. The usual amount of ore has been shipped to the mills on the river, the assays of which are about the same as heretofore.

SAVAGE.—Are extracting ore on the 500 level. The west crosscut on the 8th floor above the 600 level has been advanced 20 feet, and the east crosscut on the 5th floor of the same level has been extended 18 feet. No. 6 west crosscut on this level was advanced 24 feet, and the drift south from this crosscut is now extended 35 feet in the quartz body. A drift has been started west from the shaft station of this level, and also on the 800 level. On the 1200 level No. 3 west crosscut was extended 25 feet, and is now 290 feet in length. Its face is in heavy black clay. No. 3 east crosscut on this level was advanced 26 feet. In No. 2 west crosscut on this level have commenced upraising in the ore body, and have hoisted therefrom 17 tons of pay ore.

GOULD AND CURRY.—On the 300 level the north drift from the main west drift was advanced 40 feet; total length, 162 feet. This drift continues in quartz showing value. On the 250 level operations are confined to running drifts in various directions through the old stopes. On the 625 level the east crosscut from the main south drift was advanced 10 feet; total length, 364 feet. From the bottom of the winze the east crosscut was advanced 15 feet; total length, 67 feet. From the end of this crosscut north and south drifts have been advanced; the former 12 and the latter 15 feet. Some small streaks and bunches of good ore are being found in this part of the mine. Good headway is making in the work of repairing the two south compartments of the main shaft.

OVERMAN.—Are extracting about the usual quantity of ore from the level of the old Petaluma-street tunnel. A part of the Brunswick mill has for a time been run on Overman ore. A considerable amount of exploring work is being done, and the chances are good for opening up some considerable deposits of good milling ore.

OCCIDENTAL.—On the 200 level from the end of the south drift a west crosscut was advanced 20 feet;

total length, 42 feet. The face is in a mixture of porphyry and quartz of a favorable appearance. On the 100 level the south drift from the north incline winze was advanced 15 feet; total length, 193 feet. This drift is in quartz showing spots of ore that will pay to save.

ALTA.—The north drift on the 825 level still continues to cut streaks of fair ore. Good progress is being made in the sinking of the winze in the south drift on this level. The bottom is still showing ore of a fine quality. Ore of a good grade is still found in the drift running south on the 725 level.

NORTH OCCIDENTAL.—Work will presently be commenced through the Occidental; also from the Suro tunnel, which cuts the vein at a depth of 1300 feet below the surface. There is known to be in the mine much ore that will yield a profit at the present low prices for milling.

BALTIMORE.—A considerable amount of good milling ore is being taken out of the upraise from the 300 level. Good ore is also being taken out on the 400 level. The north and south prospecting drifts on the 300 level are progressing as usual, but as yet no crosscuts have been opened.

YELLOW JACKET.—Are extracting 200 tons of ore a day, which is being reduced at the Brunswick and Vivian mills. The ore-producing sections of the mine continue to yield and look well. A good deal of prospecting is being done in the old upper levels.

OPHIR.—On the 1300 level north winze No. 1 was sunk and timbered eight feet; total depth, 58 feet. From the bottom of this winze have started a west drift following a streak of ore running in that direction. This ore is being extracted for milling.

CROWN POINT.—Are extracting 130 tons of ore a day, which is being worked at the Mexican mill. The ore-producing sections continue to look well. The work of exploring on the streaks of ore found between the 300 and 400 levels is still continued.

HALE AND NORCROSS.—Have resumed work in the west drift on the second station (700) level and advanced it 35 feet. A portion of the force of miners has been engaged in retimbering the shaft between the 1100 and 1200 levels.

CHOLLAR.—No ore is at present being extracted, but many good deposits have been opened up at several points. Many exploring drifts and crosscuts are being run. They will be able to extract ore very rapidly when they begin milling.

HAYWOOD.—All the ore is being extracted for which crushing facilities can be found. Large bodies of ore have been opened up and await extraction. The Thompson mill is still steadily at work upon ore from the mine.

ANDES.—Good headway is making in the drift started north last week from a point 60 feet below the 240 level. It still continues in quartz, carrying some streaks of ore. The west crosscut on the 240 level is still in vein material.

BEST AND BELCHER.—On the 1500 level west crosscut No. 1 was advanced 50 feet; total length, 171 feet. The face of the crosscut is in a mixture of vein material, consisting principally of porphyry and quartz.

BELCHER.—Are taking out 100 tons of ore a day, which is being reduced at the Santiago mill. There are large deposits of ore in sight, and prospecting is continued at several points in the old upper levels.

IOWA.—The ore-producing sections of the mine are all looking well. There has been some trouble with the crushing machinery—particularly with the self-feeders—but all is now reported running well.

KNICKERBOCKER.—This old Comstock favorite is to be started up again and opened in good shape, under the superintendence of W. E. Sharon. Work will be commenced at once upon the machinery.

BULLION.—The east drift on the 300 level has been advanced 20 feet. There is no change of material in the face. A considerable amount of water is showing in the west drift on this level.

LADY WASHINGTON.—The face of the north drift on the 725 level continues in milling ore of fair grade. At this point there seems to be a large body of ore that will pay well for milling.

HENDRICKS.—The first prospecting work will be done at the 500 level, where quartz was found that gave good assays at the time A. G. McKenzie had charge of it as superintendent.

SCORPION.—On the 300 level the east drift is now out 500 feet east from the shaft, having been advanced 29 feet since last report. The drift continues in vein porphyry and clay.

Lewie District.

THE PITTSBURGH MINE.—*Silver State*, June 17: The Pittsburgh mine, in Lewis district, which was reported in these columns last week to have been sold for \$300,000, has been disposed of in London for \$30,000, which is \$270,000 more than the price first stated. The sale was made by J. A. Blossom, of Battle Mountain, through whose enterprise the mine was developed. The Pittsburgh is a gold-bearing mine, and it has produced considerable bullion.

Mt. Rose District.

OUTLOOK.—*Silver State*, June 17: The outlook in the Paradise and Wild Goose mines for some time was not as favorable as was desirable, but a rich vein of ore has been struck in the shaft running from tunnel No. 4 of the Paradise mine, so that in place of reducing the force, as was expected, Superintendent McCurdy is increasing the number so that the pay-roll shows over 100 names. The Cliff mine is an extension of the Paradise, owned by W. B. Toddhunter & Co., and superintended by Nick Frayer. A force of men has gone to Spring City, to commence excavations for the foundation of the engine-house and hoisting works soon to be erected on the Cliff mine. The timbers for the construction of the works are already on the road to the mine, and should there be no drawbacks we may expect a mining boom in Spring City and Paradise that will outstrip the boom of 8 years ago.

Tuscarora District.

THE FOUND TREASURE.—*Virginia Enterprise*, June 19: In many places on the Pacific Coast there are "hidden treasure" mines, but Tuscarora has the first "found treasure" mine of which we have heard. It is already an ore-producer, and promises soon to take its place among the leading mines of Nevada. It is situated to the northwest of the Nevada Queen and May Queen. It is on the extension of the main lode that runs through the Navajo, North Belle Isle and Nevada Queen. The continua-

tion of this vein has always been looked for to the northward, but it seems that it curves to the north-west. The vein was first found in a shaft sunk on the north line of the May Queen, and it is now conceded that it is the main vein that runs through the Navajo and other leading mines. The new mine known as the Commonwealth adjoins it on the east. The Found Treasure has recently been purchased by General R. M. Clarke and H. M. Yerington, of Carson; Thomas Brown, Cashier of the Bank of California; A. J. Ralston, of San Francisco, and W. H. Ennor and F. N. Drake, of Tuscarora. The two Tuscarora men named have a good opportunity of knowing what the mine is, as they hold an unexpired lease of it, but the company recently incorporated will soon come into possession. The mine is already a bullion-producer and has been profitably worked by Messrs. Ennor and Drake. Only the other day these parties shipped a large lot of ore to the Reno Reduction Works. It is the intention of the newly incorporated company to open the mine in a systematic manner, and soon large amounts of ore will be taken from it.

ARIZONA.

HASSAYAMPA.—Prescott *Courier*, June 18: Good miners of Hassayampa district think well of the Senator and U. P., two gold mines which have been sufficiently tested to satisfy them that they are rich enough to pay. The U. P. belongs to Messrs. La Bertue, Pace and others. Its rock has paid well in assays. The Senator belongs to Hugo Richards and Geo. W. Bowers. These ledges are in the midst of many others, and a tunnel would tap them low down. Timber is abundant in the district. Owners of the Boggs' mine, near Mayer, Big Bug district, are sinking with every prospect of opening a fine property. Geo. D. Ridenour and his partner will shortly make another shipment of 220-ounce silver ore. Jennings has just taken a lot of ore sacks to his mine, seven miles south of Prescott. Mr. Dillon, who owns mines in the Cataract creek, is visiting Prescott. The last shipment of ore paid pretty well. Mr. Jones is making foundations for a new mill; he is going to build on Groom creek. Moore and partner were recently offered \$40,000 in cash for their mine in Walker district. They preferred to keep and work it. We have great faith in certain mines of Peck district. The Peck, in a few years, yielded more than a million dollars' worth of silver, and those who worked in it before the water flooded the lower levels are confident that it has yet in store thousands of tons of rich ore. The Warrior, Prince, Alta and other ledges near Peck, have yielded good ore, and will yet be worked by people who will make money out of them.

THE GLOBE COPPER MINE.—Arizona *Silver Belt*, June 17: The present condition of the Globe mine is such that it would supply one furnace for the remainder of the present year with fine ore. During the last six months the improvements made in opening new ore bodies were of great extent and, as we understand, all paid out of the copper production, which, during the last nine months, was limited to 135 days for one furnace, so that fully 4½ months were spent for development. Nearly every level, from the first to the fifth, shows new ore discoveries, some right in the midst of old workings. The most important part, however, is the outlook in the fifth level, where very large ore bodies are traversed by a drift, yet unexplored as to its exact extent. The workings, as left now, are all in excellent shape, clean and well timbered. Under these circumstances, the policy of the owners to let the mine fill with water, and take chances of deterioration, is certainly much to be regretted.

COLORADO.

GUNNISON.—Elk Mountain *Pilot*, June 18: Gunnison county has a greater variety of minerals than any other section of the country. Our mountains are not only rich with gold and silver, but lead, copper, coal, lime, fire-clay, marble, etc. With all of these base metals and fluxes there is no excuse for shipping a pound of ore out of the county. The Illinois tunnel, near Irwin, is now 635 feet long, and Mr. Putnam reports that the last four feet were driven through a porphyry wall, very similar in character to the walls of the Great Eastern vein. The old Elko smelter is to be started up and run as a sampling works to purchase ores for the Tomitchi valley smelter. Dr. Evans is sacking ore from his Antelope mine in Redwell basin. The Bullion King mine is increasing its force, and will probably work an additional force of 25 men. Mining circles in Gunnison last Saturday were at fever heat. An important sale was made in which S. G. Gill, Walter Hamlin, Fred Leonard and Ira Brown figured as the purchasers of the Little May and Lost Condit mines, in the White Pine district. These gentlemen are all well-known citizens of Gunnison, who already owned the Mazonia mine, on the same vein. The mines purchased have produced over \$80,000 since they were discovered, and now have probably \$50,000 in sight.

IDAHO.

PONY ITEMS.—Coeur d'Alene *Record*, June 12: There are 26 quartz claims on the main gulch in the Pony district. On the west side are 13 full claims and 900 feet of the Honduras, and on the east side 12 claims and 600 feet of the Honduras. The following are the names of the locations on the east side in regular order, beginning near the head of the gulch: Windmill, Rattler, Homestake Honduras, Mammoth, Jim Blaine, Jay Eye See, North Star, Columbia, Leader, Occidental and Isadore. On the opposite side are the Jennie Winston, St. Patrick, Honduras, Legal Tender, Fay Templeton, Lizzie B. L. Fraction, Corianna and McCloud. Hauck Bros. and Jack Thompson are doing some good work on the Legal Tender. They have a fine vein of rich ore between well-defined walls. The hanging-wall is slate and the foot-wall quartzite. They are running on the vein on the Fay Templeton side of Democrat gulch, and are in about 35 feet. Van Dorn Bros. will soon begin work on the Comstock, on the divide between Pony and Potosi gulches. They have a four-foot fissure vein of rich ore. The Mammoth bids fair to prove as a good property as its neighbor across the creek. Tom Smith is doing development work on the Windmill for an interest. It is owned by Fred Krause, who also owns the Honduras, on which he is now working, and which is considered one of the

best properties in the gulch. Contracts have been let to run tunnels on the Lizzie B. L. Fraction and the Black Bass. The new town, or rather town site, extends as far up as the Templeton millsite. A good many lots have been staked, and several cabins are in course of construction. As soon as the building of the Fay Templeton quartz-mill is assured, the place will experience quite a boom, and Templeton will spring into being as one of the bona fide towns of Coeur d'Alene.

SUMMIT FLAT.—World, June 17: Thos. Barry, Sr., was up through Summit Flat district last Sunday, and as far as Willson's mine, the Mammoth, which is turning out fine ore. The mill has been running over two weeks. Fourteen men are employed at the Elkhorn, in mine and mill. This mine is turning out ore from the lower tunnel that will run high. The mill has been crushing about two weeks. A raise will soon be started from the lower tunnel for the purpose of opening up the main pay chute of the mine. The vein that is now being worked was tapped in running for the Elkhorn, and is either a separate vein or a spur of the Elkhorn. Men are at work about a mile below the Elkhorn, on what is known as the Ross claim. They are cleaning out the tunnel, preparatory to taking out ore. A company of men from Centerville are working a ledge 500 or 600 yards below the Ross mine. Two lots of ore from this mine were crushed in the Elkhorn mill last year. One lot went \$15 and the other \$40 per ton.

ELKHORN.—John Cowan, who was up at the Elkhorn mine a short time ago, says the mill, a five-stamp, is crushing 12 tons of first-class ore every 24 hours. The lower tunnel is 1230 feet in length, and is within about 90 feet of the Elkhorn ledge. The vein that is now turning out rich ore is something over 300 feet from the mouth of the tunnel. Mr. Turner has a sawmill near the quartz-mill, for sawing timbers for the mine. The quartz-mill will run until about the 1st of next month, when a cleanup will be made, and the mill will then be moved down on Elk creek, at the mouth of the long tunnel.

GOLD ROCK.—Idaho *World*, June 14: A. B. Morrell has struck good rock in his mine in Lewis' gulch. A crosscut was run from the lower tunnel and tapped a vein from two and a half to three feet thick, all of which is good milling ore. This is the best showing the mine has ever made. It was tapped about two weeks ago, and time and development, of course, will have to determine the extent of it. One man, in 12 days, took out 25 tons.

MONTANA.

THE NEW WATER SYSTEM.—Butte *Miner*, June 15: Success has attended the operation of sinking the new shaft in Silver Bow creek, opposite the Blue Bird mill, for a permanent supply of clear water for milling operations. It is expected that the water from this source will benefit the amalgamation. The water used at present is from the surface of the creek, being muddy, impure, probably containing tailings from the other mills of Butte. The clear water is obtained by sinking a shaft from the surface near the edge of the creek and drifting from it in the bedrock. The water obtained is clear as crystal. The drift will be continued until 500 gallons per minute is obtained, being the requirements of the mill. This is a much larger supply than the other mills in Butte are using. The water from the new shaft will be forced to the mill by a system not heretofore used in Butte. It is that of a double-gear pump, operated by wire rope transmission, a distance of over 600 feet. It will be driven by the main mill engine.

MADISON COUNTY MINES.—I have recently investigated the regions of the Madison goldfields. In the New Discovery the developments are rich, as is shown by assays now being made by different offices. From this and other rock shown, the future of this camp is assured. It is rich in free gold. The Paymaster, owned by Long, Ewing & Co., has been sunk 30 feet on a vein of gold-bearing quartz. The vein opened up at a width of two inches at an angle of 45 degrees. At a depth of 30 feet the vein was developed to an extent of five feet in width. The ore goes about \$10 in silver, but gold predominates to the extent of \$75 per ton. The Ida Clayton, owned by Noyes, Ewing & Co., lies next to the property owned by A. J. Davis. The battery assay from this mine shows \$12.24 in silver and \$204.80 in gold. A force of six men will be put on to the mine immediately and progressive development will take place very soon. The Amazon, located by William Noyes & Co., has only been developed to the extent of prospects, but promises to prove the richest in the camp, from the fact that the ore extracted carries free gold in abundance.

THE HIGH ORE.—The machinery at present in use at the High Ore is occasioning a good deal of trouble. The first break-down experienced was a little over a week ago, since when they have broken down twice. They shut down for the fourth time at three o'clock on Thursday from the same cause, and it is said will continue so for two months in order to put in new machinery that will avoid any future trouble. The mine is now down 600 feet, which is much too deep for their present plant; they are going still deeper. The Humboldt, that was lying idle for some time, resumed operations with a small force.

THE BLUE BIRD.—The Blue Bird Company employs about 200 men. An extra force is now employed at the mill. The same plan of development is being carried on with success and encouragement, 100 tons of ore being hoisted per day. Part of the new machinery is already in operation. The work is all completed but housing the batteries.

NEW MEXICO.

MILL.—Socorro *Bullion*, June 11: Messrs. Hermann, Gates, Logan & Graham are building a stamp-mill in the Mogollons. This will make the fourth mill in that locality. The Peacock mill will be ready to commence business in a short time. About 1500 cords of wood have been contracted for and a long pipe for conducting water to the mill is now being put in place. Burns & Co., Clearmont, Mogollon district, have recently opened up a fine body of ore, the character of which is identical with that found in the Cooney mine. All the mine needs to become a rich producer is facilities for transportation. Judge Dougherty, of this city, made an important silver strike in the Socorro last week. The time is arriving when this range will come to

the front. The resumption of work on the Merril will be the signal for the extensive prospecting of this neglected silver-bearing mountain. A sample of ore from the Big Tree mine, Hermosa, assayed by the Graphic Smelting Works, returned 506 ozs. silver and a half oz. in gold. This mine is being worked by H. B. Ferguson and Kean St. Charles, and promises to be one of the solid producers of that growing region.

OREGON.

GOLD BARS.—Oregonian, June 17: Eight small gold bars, worth about \$2000, were displayed in the window of Gove's jewelry store yesterday. They came from Charles Cornelius's Gold Hill mine, and are the first gold bars displayed here for some time.

FROM CINNABAR.—Jacksonville *Times*, June 17: David Cronmiller and E. D. Brown, a mining expert, returned from the old cinabar mines in the Siskiyou mountains yesterday, where they have been for the past two weeks. They relocated the claims that were opened several years ago and will do considerable work on them again this summer. They also report good weather in that section and grass growing finely, though everything is quite late this year.

STEAMBOAT ITEMS.—Miners are cleaning up. John O'Brien has most of the old dump worked off which is paying well. Mennis Caldwell is making a good cleanup, and will mine Bear gulch next winter. A. H. Sargent will resume work on Brush creek mines. Prickett & Co. are putting up several hundred feet of hydraulic pipe and will mine on a large scale next season. B. S. Baker of this place has invented a new device for saving gold which he claims will excel any yet made.

UTAH.

REVIEW.—Salt Lake *Tribune*, June 18: The week has been quiet, but the movement of ores has been large. The roads are being opened into the hills, and the ore taken out in the winter comes down freely. The receipts in this city for the week ending June 15th, inclusive, were \$79,883.11 in aggregate, of which \$60,865.22 was bullion and \$19,017.89 was ore. For the previous week the receipts were \$74,120.28 in bullion and \$132,182.87 in ore, a total of \$312,182.87. The product of the Ontario for the present month to date is, bullion, 40,467.27 fine ounces; ore sales for the week, \$73,397.49. The Daily output for the week was, bullion, 8821.83 fine ounces. All is going well with this mine, and the new hoisting machinery is getting pretty well in place. The Horn Silver at Frisco continues to ship ore at irregular intervals and in varying quantities. The public is not in the confidence of this concern, a statement which may also be taken in reverse, though we wish for the sake of the public, as well as of themselves, that the managers would make a frank statement of the condition of their affairs. Base bullion receipts of the week were to the value of \$15,400; gold bars, \$8000; selected lead, \$7343.89. The Hanauer smelter produced for the week, \$18,800 in bullion; the Germania, seven cars, \$11,321.33. Ore receipts in this city for the week were \$35,800 by Wells, Fargo & Co.; \$67,950 by McCormick & Co.; \$15,267.89 by T. R. Jones & Co.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court Department to, San Francisco:

PACIFIC EXPANDED METAL CO., June 17. The object is to manufacture, buy and sell slotted metallic screening as per certain patent rights. Capital stock, \$100,000. Directors—Henry L. Tatum, J. J. Bowen, S. P. Smiley, A. M. Williams and S. H. Melvin.

RAE ELECTRIC SYSTEM CO., June 20. Capital stock, \$1,000,000. Object, to construct electrical appliances to be used in the Rae system of working ores and tailings. Directors—Wm. Alvord, Geo. C. Perkins, A. P. Brayton, Julio H. Rae and Julius Jacobs.

PACIFIC COAST SUGAR CO., June 20. Capital stock, \$1,000,000. Directors—John L. Howard, E. H. Dyer, Henry T. Scott, Harvey W. Snow, Oscar T. Sewell, R. M. Anthony and W. H. Pettis.

ALTAMONT STONE QUARRY CO., June 20. Capital stock, \$500,000. Directors—G. Raich, G. R. Fletcher, H. H. Bodwell, A. K. Green and D. Gutman.

San Francisco Metal Market.

(WHOLESALE.)		THURSDAY, June 23, 1887.	
ANTIMONY—French Star.....	94	60	50
IRON—Glencoe.....	—	26	50
Explosion, 100 lb.....	—	23	60
American Soft, No. 1, ton.....	—	23	60
Oregon Pig, ton.....	21	00	23
Clippers Bag, Nos. 1 & 2.....	22	00	23
Clay Lane White.....	22	50	23
Shots, No. 1.....	30	00	—
COPPER—			
Bolt.....	19	00	21
Sheeting.....	18	00	—
Machine.....	12	00	13
Fire Box Sheets.....	—	21	—
LEAD—Pig.....	—	5	00
Bar.....	5	25	50
Shot, discount 10% on 500 bag Drop, 50 bag.....	1	80	00
Buck, 50 bag.....	2	00	00
Obilid, do.....	2	21	00
QUICKSILVER—By the flask.....	1	05	00
Flasks, new.....	85	00	—
STEEL—English, lb.....	16	25	—
Black Diamond, ordinary sizes.....	8	15	—
Flows.....	3	00	—
Machine.....	35	00	—
Naylor & Co.....	10	14	—
TINPLATE—Goke.....	5	75	60
Obard.....	6	25	00
BORAX—San Bernardino.....	7	40	84
Armstrong.....	—	0	50

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 262 Market St., S. F.

FOR WEEK ENDING JUNE 14, 1887.

364,933.—WINDMILL—F. Altman, San Jose, Cal.
364,638.—NAVIGABLE VESSELS—W. Forward, Shingletown, Cal.
364,709.—CABLE GRIP—W. Danham, Igo, Cal.
364,839.—PORTABLE STEAM BOILER—Mitchell & Fischer, Oakland, Cal.
364,727.—LOCK AND LATCH—E. Nyswonger, Hanford, Cal.
364,676.—CASK—E. Skakat, Los Angeles, Cal.
364,874.—CAR COUPLING—D. L. Vess, Spokane Falls, W. T.
364,693.—TIMBER ROLL—R. M. Webb, S. F.
364,877.—SAW SWAGE—Wheeler & Newhouse, Corvallis, Ogn.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CABLE GRIP.—Warren Danham, Igo, Shasta county. No. 364,709. Dated June 14, 1887. This grip for cable cars consists in the novel roller-jaws by which the cable is gripped or released, a center or supplementary pair of jaws for gripping the cable in case of necessity, mechanism for operating the jaws, and certain details of construction. The cable is gripped by the side faces of the rollers, so that, while affording play enough to avoid the sudden start which is the result of a too sudden grip, the jaws clamp the cable tightly enough to prevent it slipping through and thus causing abrasion in stranding.

PORTABLE STEAM BOILERS.—J. R. Mitchell and F. H. Fischer, Oakland. No. 364,839. Dated June 14, 1887. This improvement is based especially on a patent previously granted to same inventors. In the former construction, they showed water-legs carried straight up, so that the outer walls meet the boiler-shell in a line nearly or quite tangent to it, and this forms a sharp angular space within which it is difficult for water to circulate, and where it would become filled with scale in a short time and entirely impede the water circulation. In the present invention, which is especially applicable to portable steam boilers for burning straw or other light material, although not limited to these, they have extended the water-legs above or up to nearly the water-line, and in the arc of a circle, the center of which coincides with the center of the boiler-shell, this arc extending longitudinally the whole length of the water-legs.

Mining Share Market.

There is very little animation in the stock market at present, prices showing only small changes. Up on the Comstock, according to the *Enterprise*, the situation is better than for years, and is constantly improving as work progresses. It has been years since so much ore has been in sight in leading mines along the lode. All this will presently be brought to the surface, as it is only awaiting milling facilities. In the water-mills shortly to be started up a new departure is being taken, and it is probable that other mills than those on which work is at present being done will be erected at no distant day.

As for the fire in the bulkhead section of the Consolidated California and Virginia mine, it is undoubtedly extinguished. There is every indication that the carbonic acid gas injected into the mine has done its work. In a few days the bulkheads will be opened and a draft of atmospheric air allowed to pass through the inclosed section to cool off the heated rock. It will not be long before work will be resumed in this long-abandoned part of the mine. That there is in it much good ore is a fact that is well known.

Bullion Shipments.

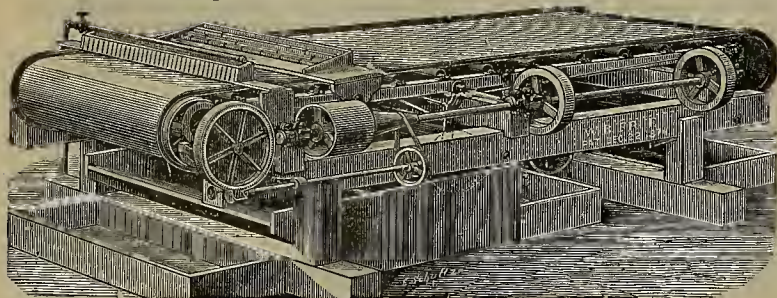
We quote shipments since our last, and shall be pleased to receive further reports:

Richmond Con., June 17, \$14,039; Gila, 19, \$7000; Candalaria, 18, \$10,000; Lexington, 19, \$28,896; Alce, 14, \$34,436; Moulton, 15, \$16,730; Bluebird, 14, \$25,856; Con. California and Virginia, 19, \$98,617; Margaret Ann, 16, \$4256; Silver Bow, 16, \$31,291; Standard, 18, \$11,980; Georene, 18, \$5000; Chicago, 20, \$3758; Hanauer, 15, \$2900; Crescent, 15, \$7800; Germania, 15, \$3130; Hanauer, 14, \$2790; Germania, 14, \$1561; Hanau, 16, \$5400; 17, \$2800; Germania, 17, \$5374. The banks of Salt Lake City report the receipt for the week ending June 15th, inclusive, of \$119,017.89 in ore and \$60,865.22 in bullion, a total of \$179,883.11.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS
(\$575.00) F. O. B.**

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

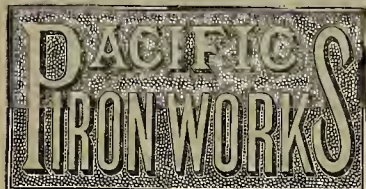
THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

ADAMS & CARTER.

Protected by patents May 4, 1883; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,
Room 7, No. 109 California Street, SAN FRANCISCO, CAL.



1850. 1887
RANKIN, BRAYTON & CO.,
...BUILDERS OF...
MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

THE HAZELTON BOILER.

A NEW AND RADICAL DEPARTURE IN

STEAM GENERATOR.

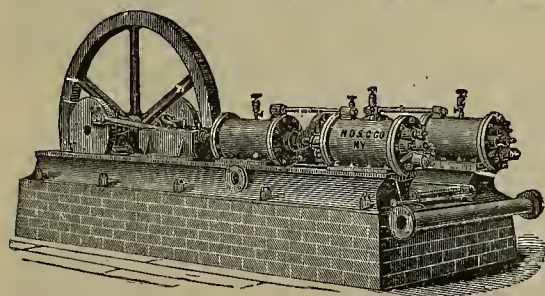
DESTINED TO REVOLUTIONIZE ALL FORMER METHODS. A SAVING IN FUEL
OF AT LEAST 25 PER CENT GUARANTEED OVER ANY
OTHER STYLE OF BOILER.

SEND FOR CIRCULARS.

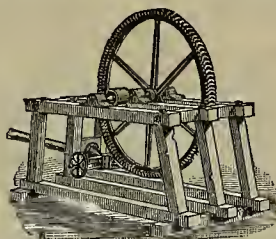
PACIFIC IRON WORKS, San Francisco, Cal.

COMPRESSED AIR and WATER POWER MACHINERY.

RIX & FIRTH, 18 and 20 Fremont St., San Francisco.



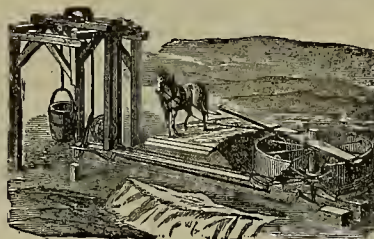
NATIONAL AIR COMPRESSORS.
SINGLE OR DUPLEX, STEAM OR BELT POWER.
62 Sold on the Pacific Coast.



KNIGHT'S WATER WHEEL,

—FOR—

MILLS, PUMPING AND HOISTING.
Over 300 in use. All estimates guaranteed. Send for Circular.

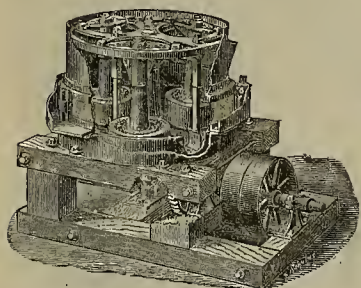


MINERS' HORSE WHIM.

All wrought iron. No gears, no breakage. One horse will easily handle rock or water to a depth of 350 feet, giving entire satisfaction to the prospector. Price, complete, \$200. 150 sold on this Coast.



NATIONAL ROCK DRILL.
200 Sold on this Coast. Has less repairs than any other Drill.



Centrifugal Roller Quartz Mill.

F. A. HUNTINGTON,

MANUFACTURER OF

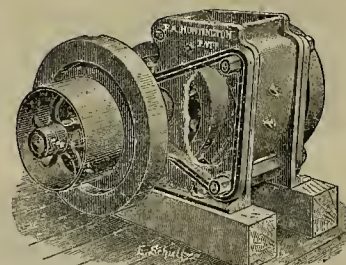
**Centrifugal Roller Quartz Mills,
CONCENTRATORS AND ORE CRUSHERS.**

Mining Machinery of Every Description,

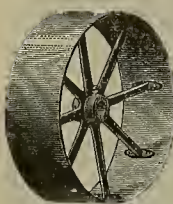
Steam Engines and Shingle Machines.

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No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.



PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 & 131 Fremont Street,

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CHILLED CAR WHEELS

AND RAILROAD CASTINGS.

IRON CASTINGS of all descriptions.

MEDAL AWARDED, MECHANICS' FAIR.

CHAS. R. STEIGER.

STEIGER & KERR,

JAS. W. KERR

OCCIDENTAL FOUNDRY, 137 First St., San Francisco, Cal.

INVENTORS, TAKE NOTICE!

L. PETERSON, MODEL MAKER,

528 Market St., N. E. cor. Front (up stairs), San Francisco. Experimental machinery and all kinds of metal, tin, copper and brass.

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This Mill as a Crusher and Pulverizer is without rival. Is in operation in leading smelting works and mills.

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FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

Huntington Centrifugal
QUARTZ MILL.

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CORNISH ROLLS,
JIGS and TROMMELS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



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GOLD AND SILVER REFINERY
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Highest Prices Paid for Gold, Silver and
Lead Ores and Sulphurets.

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LEAD PIPE,

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ALSO MANUFACTURERS OF

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OILS' GLASSWARE AND SUNDRIES, ETC.

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We would call the attention of Assayers, Chemists,
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to our full stock of Balances, Furnaces, Muffles, Crucibles,
Scorifiers, etc., including, also, a full stock of
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Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast, we feel
confident from our experience we can well suit the demand
for these goods, both as to quality and price. Our
New Illustrated Catalogue, with prices, will be sent on
application.

Our Gold and Silver Tables, showing the value per
ounce Troy at different degrees of fineness, and valuable
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Plumbago Crucible Co., London, England. Also for E.
G. DENNISTON'S Silver Plated Amalgam Plates. The
plates of this well-known manufacturer are thoroughly
reliable, and full weight of Silver guaranteed. Orders
taken at his lowest prices.

JOHN TAYLOR & CO.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

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ESTABLISHED 1869

Ores worked by any Process.

Ores Sampled.

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Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the
most suitable Process for Working Ores.

Special attention paid to Examinations of
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Ores Sampled and Assayed, and Tests made by my

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SAW MILLS AND MACHINERY

Of all kinds made to order. Send for Descriptive Catalogue.

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LOCOMOTIVE FOR SALE.

Gauge, 20 inches; height, 5 feet 6 inches; width, 4 feet;
weight (fully watered and coaled), 8 tons. Also one
extra set wheels, tools, 30-pound iron rails, etc.

Apply to
BALD MOUNTAIN MINING CO.,
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Or to 320 Sansome Street, San Francisco
Room 24.

GOLD MINERS

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Quartz, Gravel and Placer Mines!

—MY—

Silver-Plated AMALGAMATING PLATES

HAVE PROVED THE MOST ECONOMICAL AND SUCCESSFUL
PROCESS KNOWN FOR SAVING GOLD.

Over 3000 Orders Filled.

Fifteen Medals Awarded.

Old Mining Plates Bought, Replated, or Gold Separated.

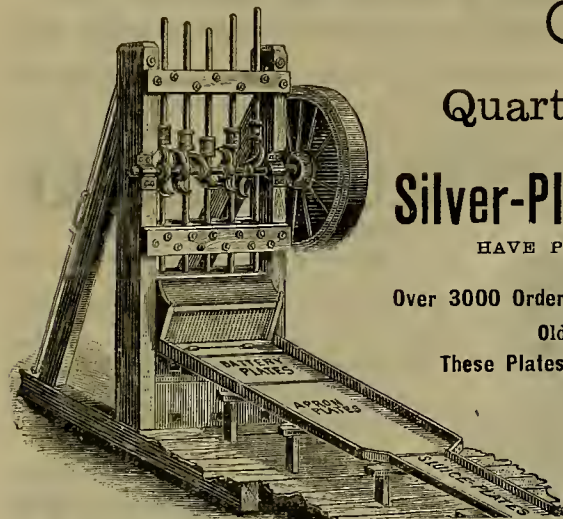
These Plates can also be purchased of JOHN TAYLOR & CO., Dealers in
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San Francisco Gold, Silver & Nickel Plating Works,

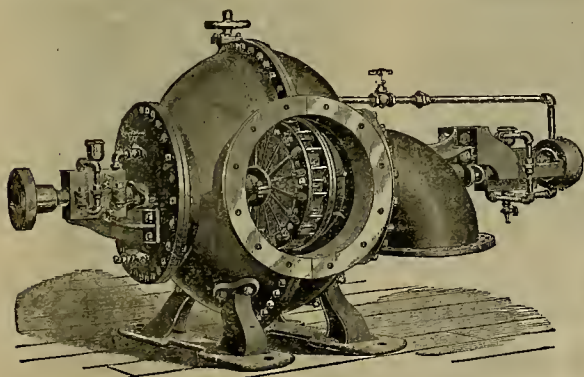
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JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and
high heads are utilized, and are guaranteed to give more power with less water than
any other wheel made. Being placed on horizontal shaft, the power is transmitted
direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in
capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the
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JAMES LEFFEL & CO.,

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FRASER & CHALMERS, General Agents,
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PNEUMATIC PULVERIZER.

The principle of pulverization consists in the employment of two

POWERFUL OPPOSING CURRENTS

Of dry super-heated steam, so arranged that they continuously charge themselves with crushed or granulated material, and by
the great force and velocity of the steam currents the minerals are dashed against each other with such power of concussion
as to cause the hardest ores to be pulverized to any degree of fineness desired. The high temperature of the super-
heated steam currents employed, through which every minute particle of ore must pass, causes them to become very
hot and dry, which produces a beneficial effect upon Sulphurets and ores containing rusty Gold. The light weight
and simplicity of construction of the Pulverizer, the extremely small and inexpensive wearing parts, are the WONDER
and SURPRISE of all who witness its operation. The Company is prepared to furnish complete plants for pulverizing

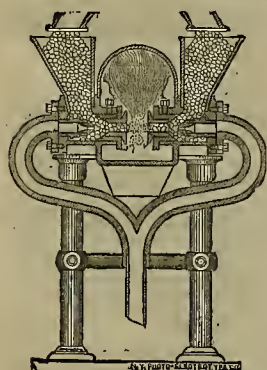
10 TO 200 TONS PER DAY,

Including a Sectional Steam Boiler supplying all the power required.

PNEUMATIC PULVERIZER COMPANY,

2 and 4 Stone Street, NEW YORK.

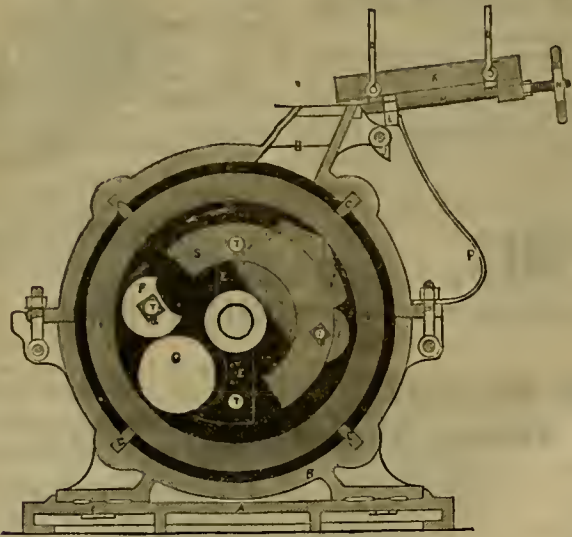
Write for Particulars.



Sectional View of Pulverizer.

L. F. HOLMAN, Pres't.
F. A. LUCKENBACH, Sup't.

THE FRISBEE-LUCOP MILL,



A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied. At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet. All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco. Certificates as to performance of the Mills, and any information required, furnished on application.

THE FRISBEE-LUCOP MILL CO.,

Office, 145 Broadway, cor. Liberty St., NEW YORK.
HOOKER & LAWRENCE, Gen'l Agents.

PATENT

LIFE-SAVING RESPIRATOR

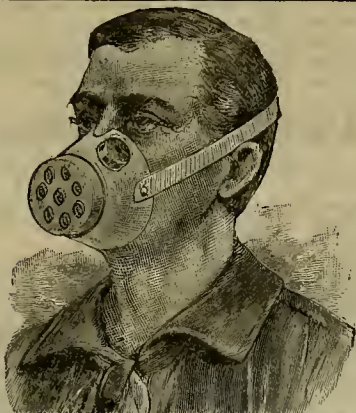
Entirely Prevents Lead Poisoning and Salivation.

The most perfect appliances for people engaged in Smelting, Dry Crushing, Gunpowder Works, Quicksilver Mines, Lead Corroding, Threshing and Stock-driving, and all other occupations where there is dust, poisonous vapor, or bad odor. In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

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Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.



CALIFORNIA VIGORIT POWDER CO.,

No. 40 California Street, San Francisco,

—MANUFACTURERS OF—

NITRO-GLYCERINE

("DYNAMITE" or "GIANT")

Blasting Powders.

Vigorit "LOW" Powder,

FOR REMOVING STUMPS AND TREES, HAS NO EQUAL.

WORKS: California City, Marin Co., Cal.

ED. G. LUKENS, Manager.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

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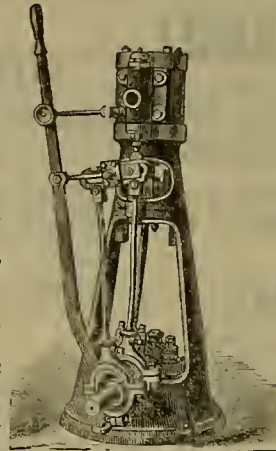
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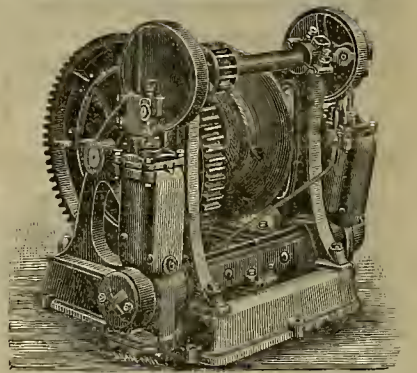
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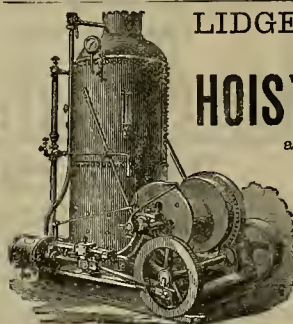
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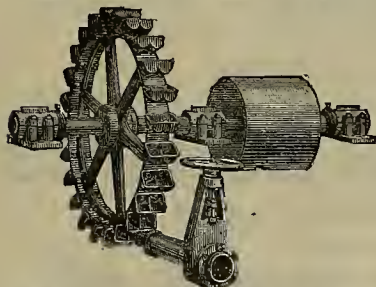
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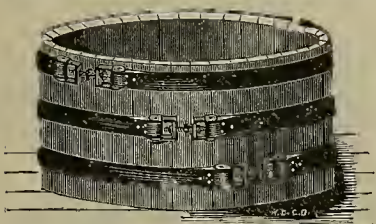


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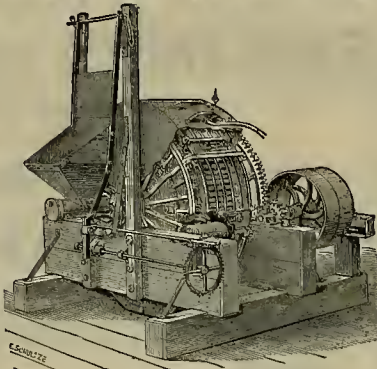
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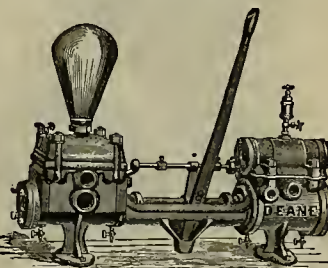
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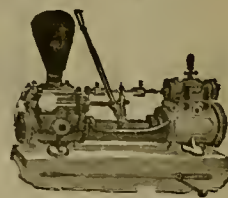
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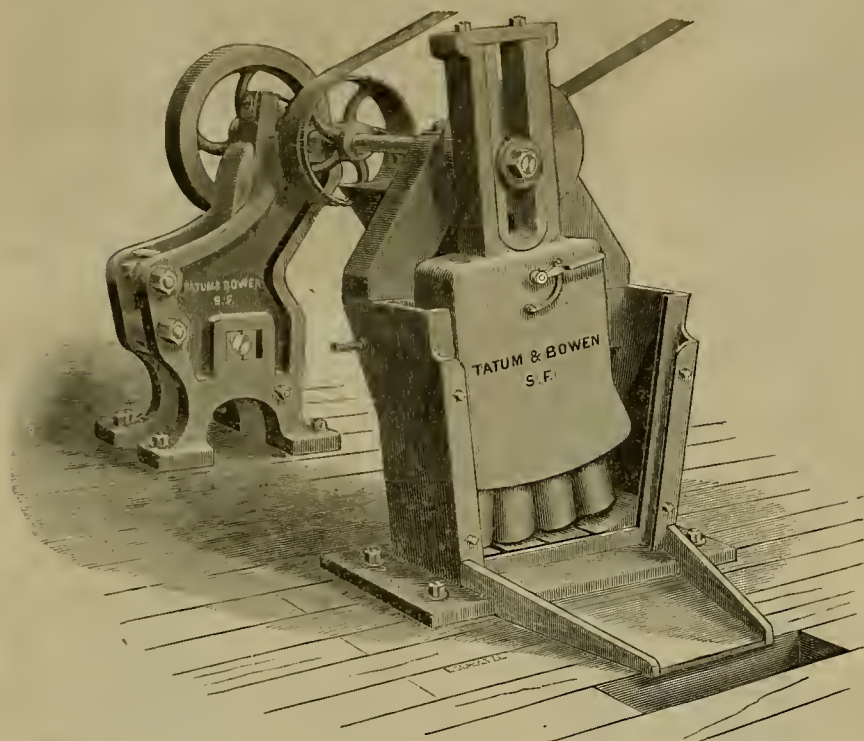
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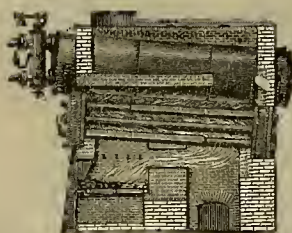
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